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GOVERNMENT REPORTS

Announcements & Index

Volume 81, Number 5 February 27, 1981

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SAMPLE ENTRY

Field 12—MATHEMATICAL SCIENCES
Group 12A—Mathematics and Statistics
PB80-104045 PC **A03**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Constructed Facilities Div.
Computation of Hankel Transforms Using the Fast-Fourier Transform Algorithm,
E. Kausel, and G. Bouckovalas. Aug 79, 49p
R79-12, NSF/RA-79-12, NSF/RA-790206
Grant NSF-ENV77-18339

An efficient numerical procedure is presented for the computation of Hankel Transforms. The algorithm is based on the expression of the Hankel Transform in terms of a two-dimensional Fourier Transform, which is then reduced to only one dimension. The latter is then evaluated with the Fast Fourier Transform algorithm. Examples are presented, and a listing of the computer program included.

NTIS Subject Category
NTIS Subcateogry
NTIS order number Availability/Price codes
Corporate or Performing Organization

Report title

Personal authors Report date Page count
Report number(s)
Contract or grant number(s)

Abstract

1. AERONAUTICS

1A. Aerodynamics

AD-A091 064/6 PC **A08**/MF **A01**
Foreign Technology Div., Wright-Patterson AFB, OH.
Aerodynamics of High Velocities (Collection of Articles).
24 Sep 80, 174p Rept no. FTD-ID(RS)T-0590-80
Edited trans. of Institut Mekhaniki MGU, Nauchnyye Trudy (USSR) n19 p1-93, 96-99, 102-151 1972.

No abstract available.

AD-A091 084/4 PC **A06**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
An Experimental Investigation of the Near Wake of a Circular Cylinder.
Master's thesis,
Ronald Eugene Walterick. Sep 80, 102p Rept no. AFIT/GAE/AA/80S-1

The near field region of the turbulent wake behind a rotating and nonrotating two dimensional circular cylinder is documented. U component mean velocities, turbulent intensities and velocity autocorrelation functions are measured at various downstream locations. From the autocorrelation functions, Taylor time microscales, longitudinal integral time scales and energy dissipation rates are computed. The measurements are performed for the flow over a circular cylinder at omega = 0 RPM and omega is approximately 500 RPM. The free stream velocity and Reynolds number, based on cylinder diameter, are respectively 5.9 m/sec and approximately 50,000. The turbulent measurements are made with a laser velocimeter using a frequency shifting phase modulator and the photon correlation processing scheme. Naturally occurring contaminant is augmented with vaporized kerosene to increase the magnitude of scattered light. Results are presented for the effects of varying omega, frequency shifting, particle concentrations and detector optics pinhole size on the turbulent quantities. (Author)

AD-A091 115/6 PC **A07**/MF **A01**
Arnold Engineering Development Center, Arnold AFS, TN.
Sting Interference Effects as Determined by Measurements of Dynamic Stability Derivatives, Surface Pressure, and Base Pressure for Mach Numbers 2 through 8.
Final rept. 25 May 77-2 Mar 78,
Bob L. Uselton, and Fred B. Cyran. Oct 80, 148p Rept no. AEDC-TR-79-89
Prepared in cooperation with ARO, Inc., Tullahoma, TN.

Wind tunnel tests were conducted to provide support interference information for planning and directing wind tunnel tests at supersonic and hypersonic Mach numbers. Sting-length and sting-diameter effects on base and surface pressures of a blunt 6-deg cone with a sliced base were investigated at Mach numbers 2, 3, 5, and 8. Dynamic stability tests on a blunt 7-deg cone were also conducted at Mach numbers 2, 5, and 8. The objectives of the 7-deg cone tests were to define critical sting lengths as determined by the measurement of dynamic stability derivatives, static pitching moment, and base pressure. Two frequencies of oscillation were investigated, and data were obtained for laminar, transitional, and turbulent boundary-layer conditions at the model base. The data from the 6- and 7-deg cone tests showed that the critical sting length depended on the interference indicator, Mach number, angle of attack, state of the model boundary layer, and frequency of oscillation. The critical sting length was generally less for models with turbulent boundary layers than for those with laminar boundary layers. A critical sting length of 2.5 model diameters was determined to be suitable for all test conditions that produced a turbulent boundary layer at or ahead of the model base. (Author)

AD-A091 119/8 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
Calculation of Three-Dimensional Unsteady Transonic Flows Past Helicopter Blades.
Technical paper,
J. J. Chattot. Oct 80, 32p NASA-A-8024, NASA-TP-1721, USAAVRADCOM-TR-80-A-2

A finite difference code for predicting the high-speed flow over the advancing helicopter rotor is presented. The code solves the low-frequency, transonic small disturbance equation and is suitable for modeling the effects of advancing blade unsteadiness on blades of nearly arbitrary planform. The method employs a quasi-conservative mixed differencing scheme and solves the resulting difference equations by an alternative direction scheme. Computed results show good agreement with experimental blade pressure data and illustrate some of the effects of varying the rotor planform. The flow unsteadiness is shown to be an indispensible part of a transonic solution. It is also shown that, close to the tip at high advance ratio, cross-flow effects can significantly affect the solution. (Author)

AD-A091 167/7 PC **A06**/MF **A01**
Nielsen Engineering and Research, Inc., Mountain View, CA.
An Improved Interaction Method for Calculating Exhaust Nozzle Boattail Flows.
Final rept. 1 Sep 78-31 Dec 79,
Gary D. Kuhn. Oct 80, 105p NEAR-TR-213, AEDC-TR-80-19
Contract F40600-77-C-0008

A turbulent boundary-layer, inviscid flow interaction method for calculating axisymmetric nozzle boattail configurations is presented. The method is applicable to flows with subsonic or supersonic free streams with Mach number in the range 0.5 - 1.5, including flows with shock-wave induced separation and to bodies with either high pressure exhaust plumes or solid plume simulators. The theory and some sample calculations are presented along with detailed instructions for preparation of input data, description of output, and instructions for operation of the computer program on an IBM 370 computer. (Author)

AD-A091 173/5 PC **A08**/MF **A01**
Pennsylvania State Univ., State College. Applied Research Lab.
Unsteady Pressure Distributions on Airfoils in Cascade.
Technical memo.,
I-Chung Shen. 1 Apr 80, 155p Rept no. ARL/PSU/TM-80-45
Contract N00024-79-C-6043

The results of a study of unsteady pressure distributions in a two-dimensional cascade of blades caused by spatial inflow velocity variations are presented. An existing incompressible, inviscid theory which employs a simplified vortex model in conjunction with the assumptions of thin airfoil theory has been used by Henderson and Bruce to derive expressions for the unsteady response, which includes the cascade unsteady lift and pitching moment. An alternative way to obtain these unsteady response parameters is to establish the expression for the unsteady pressure distribution. The unsteady lift and pitching moment are calculated by direct numerical integration over the unsteady pressure difference across the airfoil chord. Comparison of the computed theoretical results using these two approaches shows satisfactory agreement except when the wavelength of the velocity variations approaches the cascade blade spacing. Good agreement is also observed between the existing measured and predicted data. The effects of design parameters of a cascade, such as space-chord ratio, maximum blade camber, and mean incidence angle, on the unsteady response are presented and discussed. (Author)

AD-A091 378/0 PC **A06**/MF **A01**
Pratt and Whitney Aircraft Group, West Palm Beach, FL. Government Products Div.
Supercritical Airfoil Technology Program Wake Experiments and Modeling for Fore- and Aft-Loaded Compressor Cascades.
Final rept.,
D. E. Hobbs, Joel H. Wagner, J. F. Dannenhoffer, and R. P. Dring. Sep 80, 123p Rept no. PWA-FR-13514
Contract N00019-79-C-0229

A procedure has been developed for designing supercritical cascade airfoils satisfying practical aerodynamic and structural requirements. The purpose of the research reported herein is to improve the calculation of flow turning and profile loss for these airfoils through the use of a model of the viscous wake. Wakes were measured in a large-scale, low-speed facility for two cascades. The first cascade configuration was a fore-loaded supercritical design; the second was a conventional aft-loaded design. The experimental results were used to analytically model the viscous wake in an inviscid potential flow calculation.

N81-10004/2 PC **A05**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Estimation of Wing Nonlinear Aerodynamic Characteristics at Supersonic Speeds.
H. W. Carlson, and R. J. Mack. Nov 80, 84p NASA-TP-1718, L-13589

A computational system for estimation of nonlinear aerodynamic characteristics of wings at supersonic speeds was developed and was incorporated in a computer program. This corrected linearized theory method accounts for nonlinearities in the variation of basic pressure loadings with local surface slopes, predicts the degree of attainment of theoretical leading edge thrust, and provides an estimate of detached leading edge vortex loadings that result when the theoretical thrust forces are not fully realized.

N81-10011/7 PC **A04**/MF **A01**
von Karman Inst. for Fluid Dynamics, Rhode-Saint-Genese (Belgium).
Analytical Characteristics Methods: Applications.
R. Stuff. 1980, 57p VKI-PREPRINT-1980-10
Submitted for Publication. Presented at von Karman Inst. Lecture Ser. On Mathematical Methods in Fluid Mech., Rhode Saint Genese, Belgium, 25-29 Feb. 1980.

The prerequisites for application of the analytical characteristics method include analytical descriptions of the geometry of wave fronts and rays, and analytical solutions of the wave equation of the potential equation for supersonic flow. The latter are applied as initial solutions to the analytical characteristics method. Examples of application range from unsteady subsonic to steady supersonic flow, from theoretical predictions to the evaluation of the flow field from near field wind tunnel test data.

N81-10012/5 PC **A02**/MF **A01**
National Aerospace Lab., Amsterdam (Netherlands). Flight Div.
In-Flight Measurement of Aerodynamic Loads on Captive Stores. Equipment and Results.
G. J. Alders. 17 Apr 79, 12p NLR-MP-79013-U
Presented at AGARD Flight Mech. Panel Symp. On Missile System Flight Dyn., London, 21-24 May 1979.

A force balance store was developed, consisting of a support structure to be mounted on a 14 in. bomb rack, a load measuring balance and a shape representing the store to be analyzed. The shape is replaceable. A series of flight tests with two different force balance store shapes was carried out with an NF-5 aircraft. The store was mounted in the normal captive position as well as 0.15 m below. The results of the measurements are compared with data from other sources, such as wind tunnel results. Predictions, made with the computer model and using the aerodynamic data obtained with the force balance store are compared with actual drop test results. The excellent agreement indicates that in flight measurement of airloads on captive stores is a valuable tool for a better determination of the safe release envelope of external stores.

N81-10013/3 PC **A03**/MF **A01**
Aeronautical Research Inst. of Sweden, Stockholm.
A Comprehensive Evaluation and Analysis of Transonic Flow Calculations on Three Related Wing-Body Configurations.
G. Drougge, N. Agrell, and S. Hedman. 1979, 40p FFA-TN-AU-1418-PT-1
Contract FMV-F-K-82223-76-001-21-001

The design of a wing-body combination where an inverse procedure analysis based on the transonic small disturbance theory was studied. Features of aerodynamic interest were found. This led to modifications in the use of the numerical method in the wing-body design. The modified wing-body combination was again tested and the results analyzed further. It was concluded that the inverse method can be a powerful design tool and that in any case for moderate aspect ratios the concept of a wing as formed from two dimensional profiles can be replaced by the concept of a wing formed from two surfaces.

N81-10014/1 PC **A06**/MF **A01**
National Aerospace Lab., Amsterdam (Netherlands). Incompressible Aerodynamics Div.
Boundary Layer Measurements on a Two-Dimensional Wing with Flap.
B. Vandenberg. Jan 79, 110p NLR-TR-79009-U
Contract NIVR-1812

A wind tunnel experiment was performed on a wing flap configuration designed to prevent flow separations. The measurements comprised surface pressure measurements, boundary layer and wake traverses, and surface flow visualizations. Three angles of attack were applied and two widths of the gap between wing and flap, with mixing of wing wake and flap boundary layer occurring with the smaller gap. The flow phenomena were sufficiently well described by these measurements to make detail comparisons possible with calculation methods for the viscous flow around multielement airfoils.

N81-10015/8 PC **A03**/MF **A01**
Royal Aircraft Establishment, Farnborough (England).
Flow Measurements in the Wake of a Wing Fitted with a Leading-Edge Root Extension (Strake).
P. J. Butterworth. Sep 79, 40p RAE-TR-79120, RAE-AERO-3464

In a low-speed wind tunnel, measurements were taken of the velocity vector in the flow field behind the wing of a combat aircraft model. The wing was

fitted with a leading-edge root extension (strake) and could have either a plain leading edge or a deployed slat outboard. Four flow investigations were made; at three angles of incidence with the plain leading edge and at one angle of incidence with the slat deployed. The distribution of the total head deficit, the streamwise component of vorticity, and a measure of the circulation distribution in the wake of the wing were computed.

N81-10016/6 PC **A11**/MF **A01**
Royal Aircraft Establishment, Farnborough (England).
Theoretical Determination of Subsonic Oscillatory Airforce Coefficients for Fin-Tailplane Configurations.
D. E. Davies. Sep 79, 237p RAE-TR-79125, RAE-STRUCT-BF/B/0794

Linearized equations of potential flow are solved numerically for the loadings for oscillation at general frequency in any antisymmetric modes, and the generalized aerodynamic coefficients obtained. Approximation to the loadings are taken as linear combinations of basis functions. The condition satisfied by the loadings at the junction of the fin and half tailplanes is imposed on the approximations and the variational principle of Flax is applied to get the coefficients in the said linear combinations. The procedure is programmed in ICL 1900 FORTRAN. Results obtained using the program on a number of examples are given.

N81-10018/2 PC **A05**/MF**A01**E
European Space Agency, Paris (France).
Analytical Estimation on Nonlinear Longitudinal Characteristics of Wings with Small and Moderate Aspect Ratio by the Vortex Lattice Method in Incompressible Flow.
W. Schroeder. Jan 80, 80p ESA-TT-585, DFVLR-FB-78-26
Transl. Into English of 'Berechnung der Nichtlinearen Beiwerte von Fluegeln MIT Kleinem U. Mittlerem Seitenverhaeltnis Dem Wirdbelleiterverfahren in Inkompressibler Stroemung', Dfvlr, Brunswick Report Dfvlr-FB-78-26, Sept. 1978. Original Report in German Previously Announced as N79-30161. Original German Report Available from Dfvlr, Cologne Dm 31,80.

A nonlinear vortex-lattice method is described applying a force-free condition to the vortex sheet given the trailing-, side- and leading edges, respectively. In extensive test runs various influences on the numerical stability of the iterative rolling up process were studied such as the force free condition of the wake, the number of horseshoe vortices, the panel distribution along span and chord, the representation of the wakes by chains of straight vortex elements of different length and number, and the introduction of an artificial friction parameters. Because of numerical difficulties the slender delta wing itself could not be treated completely. These numerical difficulties resulting from the singular behavior of line vortices are described and ways of overcoming them are suggested.

N81-10062/0 PC **A05**/MF **A01**
Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt e.V., Brunswick (Germany, F.R.).
An Analytical Study of Landing Flare.
G. Knorr, and K. Wilhelm. Sep 79, 77p DFVLR-FB-79-40
In German; English Summary. Report Will Also Be Announced as Translation (Esa-TT-656).

The relation between landing flare and the specific dynamic characteristics of an aircraft as studied. A simple behavioral law is used to obtain analytical solutions for state variables. Both conventional flare maneuver operations and coupled control operations are investigated. The effects of wind shear on landing flare are also demonstrated. Analytical solutions applicable to a transport aircraft are discussed; these solutions lead to a definition of the time range for flare initiation.

N81-10322/8 PC **A05**/MF **A01**
Old Dominion Univ., Norfolk, VA. Dept. of Oceanography.
Free-Stream Disturbance, Continuous Eigenfunctions, Boundary-Layer Instability and Transition.
Final Report, 16 May 1979 - 15 Sep. 1980.
C. E. Grosch. Sep 80, 92p NASA-CR-163669
Grant NSG-1618

A rational foundation is presented for the application of the linear shear flows to transition prediction, and an explicit method is given for carrying out the necessary calculations. The expansions used are shown to be complete. Sample calculations show that a typical boundary layer is very sensitive to vorticity disturbances in the inner boundary layer, near the critical layer. Vorticity disturbances three or four boundary layer thicknesses above the boundary are nearly uncoupled from the boundary layer in that the amplitudes of the discrete Tollmien-Schlicting waves are an extremely small fraction of the amplitude of the disturbance.

N81-10332/7 PC **A02**/MF **A01**
Max-Planck-Institut fuer Stroemungsforschung, Goettingen (Germany, F.R.).
Propagation of Finite-Amplitude Waves in a Nearly Parallel Flow.
G. Zimmermann. Nov 79, 20p MPIS-21/1979, ISSN-0436-1199

The equations governing the long range propagation of two dimensional nonlinear disturbance waves in a boundary layer are derived assuming that the boundary layer thickness and the wavelength are of the same order of magnitude and that the Reynolds number is large. A multiple scales method is used with the Reynolds number as an expansion parameter. The resulting equations constitute a spatial initial boundary value problem which can be numerically solved.

N81-10636/1 PC **A05**/MF **A01**
FWG Associates, Inc., Tullahoma, TN.
Pilot-Aircraft System Reponse to Wind Shear.
Interim Report.
B. S. Turkel, and W. Frost. Nov 80, 98p NASA-CR-3342
Contract NAS8-33458

The nonlinear aircraft motion and automatic control model is expanded to incorporate the human pilot into simulations of aircraft response to wind to wind shear. The human pilot is described by a constant gains lag filter. Two runs are carried out using pilot transfer functions. Fixed-stick, autopilot, and manned computer simulations are made with an aircraft having characteristics of a small commuter type aircraft flown through longitudinal winds measured by a Doppler radar beamed along the glide slope. Simulations are also made flying an aircraft through sinusoidal head wind and tail wind shears at the phugoid frequency to evaluate the response of manned aircraft in thunderstorm wind environments.

1B. Aeronautics

AD-A091 007/5 PC **A03**/MF **A01**
Transportation Systems Center, Cambridge, MA.
Visual Confirmation (VICON) of Voice Take-Off Clearance of Cost-and-Deployment Analyses and Strategies.
Final rept. Jan 78-Aug 80,
John R. Coonan. Sep 80, 31p TSC-FAA-80-16, FAA-RD-80-108
Contract DOT-FA021/R0119

This report presents the final results of a program undertaken by the Transportation Systems Center (TSC), to study cost-and-deployment strategies of VICON installations over a four-year period. (Author)

AD-A091 240/2 PC **A06**/MF **A01**
Anacapa Sciences, Inc., Santa Barbara, CA.
Topographic Information Requirements and Computer-Graphic Display Techniques for Nap-of-the-Earth Flight.
Annual technical rept. Jan-Dec 79,
Steven P. Rogers, and Kenneth D. Cross. Dec 79, 101p AS-365-79, USAAVRADCOM-TR-78-0012-F
Contract DAHC19-78-C-0012

This report describes a study undertaken to identify tasks required of Army aviators performing terrain flight, and to determine the ways in which a computer-generated topographic display might aid in the conduct of these tasks. The report provides: (a) an inventory of the full range of preflight and inflight tasks performed by the Army aviator that require the use of map products, overlays, and geographic data; (b) a review of the recent developments and state-of-the-art in computer graphics technology that are applicable to the production of map products and related displays; and (c) descriptions of computer-graphic capabilities that have potential value for the conduct of flight planning, the conduct of navigation, and the accomplishment of related tasks. (Author)

AD-A091 288/1 PC **A04**/MF **A01**
Federal Aviation Administration, Washington, DC. Office of Aviation Policy.
FAA Aviation Forecasts, Fiscal Years 1981-1992.
Sep 80, 69p Rept no. FAA-AVP-80-8

The aviation activity at FAA towered airports, in the aerospace under the control of the Air Route Traffic Control Centers, and the services provided by the Flight Service Stations are forecast for the several user groups--trunk and local service airlines, commuter airlines and air taxis, general aviation, and the military. Discussion of trends and events with special implications for aviation highlight the challenges and opportunities that lie ahead for aviation. Also presented are forecasts based on three alternative scenarios: economic expansion, energy conservation and stagflation. The alternative scenario forecasts provide a range around the baseline forecasts for planning purposes both within the FAA as well as for other users of the FAA forecasts. (Author)

1C. Aircraft

AD-A090 895/4 PC **A08**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH.
A Flight Investigation of Digital Control Using Microprocessor Technology.
Master's thesis,
James C. Seat. Jun 79, 164p Rept no. AFIT-CI-79-188T

A microprocessor-based digital flight control system (Micro-DFCS) is implemented in Princeton's Variable-Response Research Aircraft (VRA), and evaluated through flight testing. The flight control computer program, CAS-1, provides three longitudinal control options; direct (unaugmented) command, pitch rate command, and normal acceleration command. The latter two options are Type 0 systems designed by linear-quadratic control theory. The flight tests are designed to investigate the characteristics of these control laws in flight, to provide experimental evidence for sampling rate requirements, and to demonstrate digital flight control of the VRA with the Micro-DFCS.

AD-A090 980/4 PC **A19**/MF **A01**
Foreign Technology Div., Wright-Patterson AFB, OH.
De-Icing Systems of Flight Vehicles. Bases of Design Methods for Testing. Part 1,
R. Kh. Tenishev, B. A. Stroganov, V. S. Savin, V. K. Kordinov, and A. I. Teslenko. 7 Sep 79, 438p Rept no. FTD-ID(RS)T-1163-79-PT-1
Unedited machine trans. of Protivoobledenitel'nyye Sistemy Letatel'nykh Apparatov. Osnovy Proyektirovaniya i Metody Ispytaniy, Moscow 1967, p1-197. See also Part 2, AD-A090 981.

No abstract available.

AD-A090 981/2 PC **A12**/MF **A01**
Foreign Technology Div., Wright-Patterson AFB, OH.
De-Icing Systems of Flight Vehicles. Bases of Design Methods for Testing. Part 2,
R. Kh. Tenishev, B. A. Stroganov, V. S. Savin, V. K. Kordinov, and A. I. Teslenko. 7 Sep 79, 251p Rept no. FTD-ID(RS)T-1163-79-PT-2
Unedited machine trans. of mono. Protivoobledenitel'nyye Sistemy Letatel'nykh Ap-

paratov. Osnovy Proyektirovaniya i Metody Ispytaniy, Moscow 1967, p198-320. See also Part 1, AD-A090 980.

No abstract available.

AD-A091 014/1 PC **A08**/MF **A01**
Air Force Wright Aeronautical Labs., Wright-Patterson AFB, OH.
Design of a Lateral Stability Augmentation System for the F-106 to Improve Lateral Handling Qualities During Tracking.
Technical rept. May 77-Jan 79,
Richard D. Holdridge. Jul 80, 165p Rept no. AFWAL-TR-80-3015

An improved lateral stability augmentation system has been developed to improve the handling qualities of the F-106 in the air-to-air tracking task. The existing yaw rate and roll rate feedbacks, as well as the aileron to rudder interconnect, were removed and replaced with calculated sideslip rate and measured sideslip feedbacks. An advanced root locus technique, the root map was used to set the gains on sideslip and sideslip rate. The resulting system was evaluated using a nonpiloted hybrid simulation as well as a digital frequency domain analysis program. The system was then evaluated by operational F-106 pilots using the Flight Dynamics Laboratory's LAMARS motion based simulator. Based on simulator results, the system was installed on an F-106 and flight tested at Tyndall AFB, Florida. The results of basic analyses, nonpiloted simulations, piloted simulations, and flight test are presented. (Author)

AD-A091 051/3 PC **A08**/MF **A01**
Air Force Flight Dynamics Lab., Wright-Patterson AFB, OH.
Evaluation of the Impact Computer Program as a Linear Design Tool for Bird-Resistant Aircraft Transparencies.
Final rept. 1 Jan-1 Aug 78,
Robert E. McCarty. Mar 80, 166p Rept no. AFFDL-TR-79-3103

The use of a finite element structural analysis computer program called IMPACT to simulate the transient response of B-1 aircraft windshield panels to bird impact is discussed. For the two simulations accomplished, computed results were compared to experimental data acquired during bird impact tests of actual windshield panels. For the first case of a panel tested at ambient temperature the computed results were qualitatively accurate. Strain levels measured during the test exceeded those calculated by IMPACT, however, and the disagreement was attributed to the presence of geometric nonlinearities in the test structure the effects of which were not accounted for in the IMPACT analysis. For the second case of a panel heated to an outer surface temperature of 220 deg F the computed results were unreasonable. Disagreement between computed and experimental data was attributed to errors in the theoretical formulation or coding of IMPACT relating to its capability to account for the effects of elevated temperatures or temperature gradients within the structure. Continued development of IMPACT is not recommended; a currently available fully nonlinear finite element program is identified which has more potential of serving as a transparency birdstrike analysis tool.

AD-A091 073/7 PC **A05**/MF **A01**
Center for Naval Analyses Alexandria Va Operations Evaluation Group
A Reprint of 'A Method of Estimating Plane Vulnerability Based on Damage of Survivors.
Research contribution,
Abraham Wald. Jul 80, 96p Rept no. CRC-432

This research contribution consists of a series of eight memoranda originally published by the Statistical Research Group at Columbia University for the National Defense Research Committee in 1943 on methods of estimating the vulnerability of various parts of an aircraft based on damage to surviving planes. The methodology presented continues to be valuable in defense analysis and, therfore, has been reprinted by the Center for Naval Analyses in order to achieve wider dissemination. (Author)

AD-A091 074/5 PC **A05**/MF **A01**
Bell Helicopter Textron, Fort Worth, TX.
Experimental Installation of Mast Mounted Sight on an OH-58C Helicopter.
Final rept. Mar 78-Jan 80,
James A. Rule, Horace W. Hanson, Harry K. Harr, John P. Norvell, and David A. Popelka. Oct 80, 80p USAAVRADCOM-TR-80-D-25
Contract DAAK10-78-C-0115

The purpose of this effort was to investigate the load and vibration effects of installing a Rockwell mast mounted sight (MMS) on an OH-58C helicopter and to determine the environment in which the sight would operate. The task consisted of analytical studies, tests with a dummy sight, and installation and test of an operational sight. (Author)

AD-A091 089/3 MF **A01**
Martin Marietta Aerospace, Orlando, FL.
Performance Verification of the 'Superjet' Laminar Angular Rate Sensor.
Final rept. 5 Nov 79-5 May 80,
Boyd W. Curry, Jr. May 80, 205p OR-16127, NADC-80081-60
Contract DAAK40-79-D-0017
Availability: Microfiche copies only.

The need exists for small rugged rate sensors applicable to the Navy's Maximum Performance Escape System. A recent study indicated that a prime candidate for this system is the Superjet rate sensor used on the U.S. Army Copperhead Program. The purpose of this performance verification task is to determine through test and analyses the suitability of the Hamilton-Standard Superjet angular rate sensor for the possible application in NADC's Maximum Performance Escape System (MPES) program.

AD-A091 109/9 PC **A04**/MF **A01**
Aeronautical Systems Div Wright-Patterson AFB OH Deputy for Development Planning
Acquisition Strategy Implications of a Long Range Combat Aircraft (LRCA).
Final rept. Feb-Jun 80,
Jerome P. Sutton. Jul 80, 74p Rept no. ASD/XRM-TR-80-5044

This report contains a discussion of the acquisition implications of the Long Range Combat Aircraft (LRCA) to include: affordability, availability, logistics, and SALT II aspects. Assessment of the LRCA concept involved consideration of two alternative program schedules, Milestone II - 1981, and Milestone II - 1985, and thus, consideration of a near term and mid-term technology level. Since the LRCA is in a pre-Milestone 0 status, no firm conclusions regarding an ultimate program can be reached; results of this assessment would support some preliminary implications. For the LRCA to be affordable requires that substantive reprogramming of the budget be undertaken. More importantly, the priority of the program must be sustained throughout the acquisition cycle. The availability of resources to support the LRCA requires planning and management and does not present insurmountable difficulties. The initial operational capability (IOC) may, depending on the exigency of the need, not be when one may wish it. Full capability is most likely not possible prior to the mid-1990s. The final design of the LRCA and its weapons complement are dependent upon consideration of the Strategic Arms Limitation Treaty (SALT II) as ratified.

AD-A091 292/3 PC **A17**/MF **A01**
Federal Aviation Administration, Washington, DC. Office of Environment and Energy.
Noise Levels and Data Correction Analysis for Seven General Aviation Propeller Aircraft.
Final rept.,
David W. Ford, and Edward J. Rickley. Sep 80, 376p Rept no. FAA/EE-80-26

This document reports noise levels of a general aviation propeller aircraft noise test at the FAA National Aviation Facility Experimental Center located in Atlantic City, New Jersey. The test was performed to acquire noise data on general aviation type aircraft and examine how these noise levels are influenced by variables such as distance, aircraft speed, power settings, and propeller speeds. Aircraft were tested during takeoff, approach, and flyover modes and data are given in EPNL and in 'A'-weighted decibels. All measurements were performed in accordance with FAR 36 Appendix C and Appendix F procedures. (Author)

AD-B025 971/3 PC **A02**/MF **A01**
Goodrich (B F) CO Akron Ohio
Replaceable Tread Tire Prototype Development for C-130 Military Aircraft Flight Tests.
Final rept. May 76-Aug 77,
James W. Pond. Aug 77, 19p AFFDL-TR-77-74
Contract F33615-76-C-3060
Distribution limitation now removed.

Two assemblies, 51.5x20-20, featuring standard aircraft tire rubber coat, completed 310 dynamic test cycles. Two assemblies, featuring an alternate rubber carcass coat, failed prematurely.

AD-B029 067/6 PC **A04**/MF **A01**
Dayton Univ., OH. Research Inst.
A-10 Windshield Spall Tests.
Final rept. Sep 73-Feb 78,
Gerald B. Bennet, E. Radgowski, B. Rice, and J. S. Pharmer. Apr 78, 54p ASD-TR-77-77
Contract F33615-77-C-0110
Prepared in cooperation with Fairchild Republic Co., Farmingdale, NY.
Distribution limitation now removed.

Ballistic tests were conducted to determine the susceptibility to spall of two different types of bullet resistant glass. The specific purpose was to verify attainment of specification requirements to defeat the design threat and minimize injury to the pilot from backface spall at 200 fps beyond design impact condition. Both types consisted of transparent glass panels laminated together with polyvinyl butyral interlayers. The first type contained three glass panels; the second type contained four. The tests showed that as the number of glass layers increased, less backface spall was generated. The loss of visibility when hit by a projectile was about the same for both types. Tests were also conducted on two different types of material for the side windshield panels of the A-10, one of stretched acrylic and the other an 'acrylic sandwich' consisting of an as-cast acrylic-poly-carbonate laminate. The results showed that the as-cast acrylic-poly-carbonate laminate material was superior to the stretched acrylic for reduced susceptibility to spall and reduced lethal hazard posed to the pilot. (Author)

N81-10019/0 PC **A10**/MF **A01**
Human Resources Research Organization, Alexandria, VA.
Civil Helicopter Wire Strike Assessment Study. Volume 2: Accident Analysis Briefs.
Final Report.
C. H. Tuomela, and M. F. Brennan. Oct 80, 221p NASA-CR-152390, FR-MTRD(CA)-80-13-V-2
Contract NAS2-10505

A description and analysis of each of the 208 civil helicopter wire strike accidents reported to the National Transportation Safety Board (NTSB) for the ten year period 1970-1979 is given. The accident analysis briefs were based on pilot reports, FAA investigation reports, and such accident photographs as were made available. Briefs were grouped by year and, within year, by NTSB accident report number.

N81-10020/8 PC **A10**/MF **A01**
Crash Research Inst., Tempe, AZ.
Systems Analysis of the Installation, Mounting, and Activation of Emergency Locator Transmitters in General Aviation Aircraft.
Final Report.
D. S. Hall. 10 Jan 80, 218p NASA-CR-160036, CRI-7846-14
Contract NAS5-25444

A development program was developed to design and improve the Emergency Locator Transmitter (ELT) transmitter and to improve the installation in the aircraft and its activation subsystem. There were 1135 general aviation fixed wing aircraft accident files reviewed. A detailed description of the damage to the aircraft was produced. The search aspects of these accidents were studied. As much information as possible about the ELT units in these cases was collected. The data should assist in establishing installation and mounting criteria, better design standards for activation subsystems, and requirements for the new ELT system design in the area of crashworthiness.

N81-10025/7 PC **A02**/MF **A01**
Societe Nationale Industrielle Aerospatiale, Les Mureaux (France).
Applications of Pyrotechniques in Aviation des Applications de la Pyrotechnie dans le Domaine Aeronautique.
S. Morlan. 1979, 6p SNIAS-792-422-103
Text in French. Presented at Congr. On Explosifs et Pyrotech.: Appl. Spatiales, Toulouse, 22-25 Oct. 1979.

The cutting of canopies and windows in aircraft to permit abandonment in emergencies is discussed. The advantages of pyrotechnic logic circuits are presented. The use of pyrotechnics for opening cabin windows in a prototype Corvette aircraft is illustrated. Possible applications for assisting in ground evacuations in civilian transport aircraft are mentioned.

N81-10054/7 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
The XV-15 Tilt Rotor Research Aircraft.
D. C. Dugan, R. G. Erhart, and L. G. Schroers. Sep 80, 21p NASA-TM-81244, AVRADCOM-TR-80-A-15
Prepared in Cooperation with Avradcom.

The design characteristics of the XV-15 Tilt rotor research aircraft are presented. Particular attention is given to the following: control system; conversion system; and propulsion system. Flight test results are also reported.

N81-10454/9 PC **A03**/MF **A01**
Politecnico di Milano (Italy).
Evaluation of Section Properties for Hollow Composite BEAMS.
V. Giavotto, M. Borri, L. Puccinelli, V. Caramaschi, and F. Mussi. 7 Sep 79, 30p PAPER-NR-35
Presented at the Fifth European Rotorcraft and Powered Lift Aircraft Forum, Amsterdam, 4-7 Sep. 1979.

The plan for the development and the validation of design procedures for composite beam-like structures and structural components is described. Analytical as well as experimental results are reported. The development of the program HANBA (Hollow Anisotropic Beam Analysis) which, based on an original displacement method approach, allows the evaluation of section stiffnesses and stresses is presented. The program works on a finite element idealization of the beam section and computes the stresses from the resultant forces and moments acting on the particular section, as the usual engineer's beam theory. Experimental results mainly concern the identification of elastic properties for composite laminates, at relativevly low stress levels, and the validation of the results of the program HANBA. Analytical results compare very well with experimental ones, the largest differences in section stiffenesses so far evaluated being of the order of 1%. The plan is still going on and future activities are also outlined in the paper.

N81-10576/9 PC **A04**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Survey Population Response to Airplane Noise, Part 1.
C. Bitter, and K. W. Schwager. May 80, 71p NASA-TM-75790, REPT-D-19
Contract NASW-3199
Transl. Into English from Enouete Reacties Bevolking OP Vliegtuiglawaai, (Leiden), Aug. 1964 69 p. Transl. By Kanner (Leo) Associates, Redwood City, Calif. Original DOC. Prep. By Institute for Health Techniques, TNO, Netherlands.

A questionnaire concerning aircraft noise is presented. The tabulated responses to it are also presented.

PB81-114886 MF **A01**
National Research Council, Washington, DC.
Improving Aircraft Safety.
Jun 80, 131p ISBN-0-309-03091-9
Contract DTOS59-80-C-00028
Library of Congress catalog card no. 80-82605.
Microfiche copy only.

A six-month assessment of the adequacy of the Federal Aviation Administration's policies and procedures for certifying the airworthiness of commercial transport aircraft was undertaken. Airworthiness is the aspect of air safety related to the design, manufacture, and maintenance of airplanes and does not embrace such other key safety matters as airlines and flight crew operations or air traffic control, which are also within the province of the FAA. The study involved questions about the efficacy of the nation's system for assuring both the traveling public and domestic and foreign purchasers that American-built aircraft continue to warrant their world-wide reputation for safety, durability, and reliability. The study examined the ways in which the FAA approves the design, fabrication, and production of each new aircraft, as well as the maintenance and continuing airworthiness of each airplane. Concentrating on the large passenger aircraft used by the major commercial airlines, the committee's charter excluded from its study the certification of engines, airplanes operated by commuter airlines, businesses, and individuals, as well as aircraft under 12,500 pounds. The practice of awarding actual certificates for design, production, and airworthiness has resulted in reference to the system as 'certification,' and to aircraft as having been 'certificated.' Because both terms are widely used in practice and in the regulations, they appear throughout the report to describe the FAA's process of assuring the safety of aircraft.

PB81-116790 PC **A02**/MF **A01**
National Research Council, Washington, DC.
An Evaluation of NASA's Program for Improving Aircraft Fuel Efficiency.
Final rept.
1980, 25p
Contract NASW-2342

The report is an evaluation of NASA's program of research and technology to make possible the improvement of the fuel efficiency of transport aircraft. The report provides commentary and recommendations where appropriate on each of the major elements of the program. Despite some recommended changes, the committee concludes the program is a good one and the results, some of which have already been applied by industry, will be effective in improving aircraft fuel efficiency. Key findings of the committee included a recommendation that closer ties be established between NASA and the FAA to expedite the use and acceptance of the new technology. The committee also cited the potential for fuel savings through an improved air traffic control system and recommended that the management of NASA and the FAA discuss ways and means to work together to exploit more effectively the capabilities and responsibilities of each to develop air traffic control.

1D. Aircraft Flight Control and Instrumentation

AD-A090 634/3 PC **A16**/MF **A01**
Boeing Commercial Airplane Co., Seattle, WA.
Aircraft Alerting Systems Standardization Study.
Final rept. Jan-Nov 79 on Phase 1,
G. P. Boucek, J. B. Erickson, B. L. Berson, D. C. Hanson, and M. F. Leffler. Feb 80, 372p D6-49273, FAA-RD-80-68
Contract DOT-FA79WA-4268
Prepared in cooperation with Douglas Aircraft Co., and Lockheed Aircraft Co. See also Rept. nos. FAA-RD-76-222-1, AD-A042 328 and FAA-RD-76-222-2, AD-A043 383.

This report is one of a series of documented studies and experiments directed to the improvement and standardization of cockpit alerting systems. The efforts in this current study are noteworthy in that the three major manufacturers of Commercial Transport Aircraft, Douglas, Lockheed, and Boeing conducted the tests and co-authored this report. The primary purpose of the study is to extend and validate, through simulation, the precepts advanced in the previous contract study. The primary purpose of this report is to document the results of objective and subjective tests and the development of the functional design of the candidate alerting systems which will be implemented and evaluated in a flight simulator. (Author)

AD-A090 961/4 PC **A07**/MF **A01**
Advisory Group for Aerospace Research and Development, Neuilly-sur-Seine (France).
AGARD Flight Test Instrumentation Series. Volume 11. Pressure and Flow Measurement,
W. Wuest. Jul 80, 139p Rept no. AGARD-AG-160-VOL-11
See also Volume 10, AD-A089 909.

This AGARDograph is the 11th of the AGARD Flight Test Instrumentation Series and discusses the fundamentals of pressure and flow measurement from the viewpoint of flight test instrumentation. The evolution of flight test instrumentation systems during the last decade reflects the radical changes in electronic measuring techniques. Nevertheless, the basic principles of measurement methods are essentially unchanged and the sensors for pressure and flow measurements have experienced only slight changes. An overview of modern instrumentation is given with important applications to altitude measurement, vertical and horizontal speed measurement, boundary layer, wake an engine flow measurement. The scope of this AGARDograph is to give self consistent information on the different techniques and systems and to give references for a more detailed study of special techniques. (Author)

AD-A091 129/7 PC **A02**/MF **A01**
Human Engineering Lab., Aberdeen Proving Ground, MD.
Helicopter In-Flight Validation System (HELIVALS).
Final rept.,
Thomas L. Frezell, Gordon Herald, Richard S. Camden, and Clarence A. Fry. Aug 80, 25p Rept no. HEL-TM-17-80

This report described the Helicopter In-Flight Validation System (HELIVALS). The system monitors all six degrees of freedom of the helicopter flight control position to include cyclic, collective and anti-torque pedals; along with airspeed, altitude (both barometric and absolute), and geographic position. These data are recorded digitally on a magnetic tape recorder mounted in the helicopter. The recorded data is then processed and reduced in a ground station. (Author)

N81-10064/6 PC **A04**/MF**A01**;
Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt e.V., Brunswick (Germany, F.R.).
System Simulation Applied to the Evaluation of Displays for Guidance and Control.
U. Teegen. Jun 79, 62p DFVLR-MITT-79-10
In German; English Summary. Report Will Also Be Announced as Translation (Esa-TT-659).

The development of displays for monitoring and controlling complex technical systems is facilitated by employing a computer simulation of the man-machine system during the theoretical design phase. A simulation model for the manual control task is described which leads to a method for evaluating displays. The capabilities and applications of this simulation model to a pilot airplane system restricted to aircraft motion in the vertical plane and a two channel pilot mode are presented. The results obtained suggest that the model should be further developed.

N81-10078/6 PC **A05**/MF**A01**;
Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt e.V., Brunswick (Germany, F.R.).
Flight Test Results of the Hfb 320 Model Following Control System for the in-Flight Simulation of Airbus A 130.
Sep 79, 76p DFVLR-MITT-79-13
In German; English Summary. Report Will Also Be Announced as Translation (Esa-TT-660).

The programming of the airborne computer is discussed. The effects on nonlinearities were demonstrated from the results of ground-based simulation of the test aircraft, model and control system. The high quality of the A 310 model aircraft simulation is confirmed from the flight-test results obtained. Examples are presented in which the

ground based simulation technique is used to predict flight test results.

1E. Air Facilities

AD-A091 156/0 PC **A08**/MF **A01**
PACER Systems, Inc., Arlington, VA.
Study of Heliport Airspace and Real Estate Requirements.
Final rept. Mar-Jul 80,
A. G. DeLucien, and F. D. Smith. Aug 80, 151p
PAR-037-80, FAA-RD-80-107
Contract DOT-FA79WAI-019

This report documents the review and evaluation of real estate and airspace requirements as set forth in applicable U.S. heliport design criteria. International criteria are reviewed to discern their rationale for various requirements. Helicopter performance during normal and failure-state operations is analyzed. The suitability of current criteria is examined with respect to various operational profiles. Modifications to current criteria are suggested which would accommodate various operational requirements and varying levels of terminal instrument procedures capability. Recommendations include a revised heliport classification scheme with corresponding changes to real estate and airspace criteria for IFR operations; helicopter performance chart standardization for flight manuals with specific data requirements; consideration of obstacle clearance for failure-state operations; additional criteria for offshore facilities; and revised criteria for elevated heliports/helipads. (Author)

N81-10577/7 PC **A04**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Annoyance from Light Aircraft Investigation Carried out around Four Airports Near Paris.
Apr 80, 55p NASA-TM-75823
Contract NASW-3199
Transl. Into English of la Gene Causee Par Laviation Legere-Enquete Effectuee Autour de Quatre Aerodromes de la Region Parisienne. Transl. By Kanner (Leo) Associates, Redwood City, Calif. Original DOC. Prep. By Centre Ketudes et de Recherches Pyschologiques Air and Analyse, Recherche et Conseil en Marketing et Communication (Paris).

An opinion survey was carried out on residents living near four airports in the Paris, France area. An evaluation of their responses concerning noise pollution and possible expansion of airport activity is presented.

2. AGRICULTURE

2B. Agricultural Economics

PB81-109498 PC **A03**/MF **A01**
Economics and Statistics Service, Washington, DC. National Economics Div.
Thin Markets for Agricultural Products: Causes, Effects, and Public Policy Options,
Ed Jesse. Oct 80, 38p AGESS-801002.2

Changing methods of price discovery for several agricultural commodities have resulted in thinly-traded markets: markets in which buyer-seller negotiation occur for only a small proportion of total volume traded. As markets become thin, reported prices become less reliable indicators of overall supply and demand conditions and the potential for price manipulation may increase. Methods to rectify possible performance problems attributable to thin markets include encouraging open public trading and improving the quantity and quality of price reports.

PB81-116477 PC **A17**/MF **A01**
Arizona Univ., Tucson. Office of Arid Lands Studies.
The Development of an Indian Reservation-Based Jojoba Industry.
Final rept.,
Kennith E. Foster, L. Susan Anderson, William H. Brooks, Helen A. Kassander, and B. Kim Mortensen. Feb 80, 390p NSF/RA-800232
Grant NSF-ISP77-04295
Prepared in cooperation with Midwest Research Inst., Kansas City, MO.

Analyses were performed of the economic, social, and environmental aspects of jojoba commercialization. Three tasks were delineated: jojoba production analysis; industrial process and product analysis; and marketing analysis. The second and third tasks are presented. The costs of processing jojoba seeds into eight potentially marketable products and the costs of those products were determined. Processing costs were estimated for basic products manufactured in Indian-owned processing plants with three different capacities (500 tons seeds/year; 5,000 tons seeds/year; and 75,000 tons seeds/year) and for secondary products at various production levels. The properties and uses of potential jojoba products are described. The supply, demand, and price factors for competitive products are summarized. The supply and cost of jojoba seeds and products in the U.S. jojoba agro-industry for the years 1980 to 1999 are discussed. The potential demand for jojoba products is evaluated. The product markets, sales, costs, revenues, and profits of the jojoba industry from 1980 to 1999 are analyzed. Enterprise options are evaluated for their social feasibility and environmental impact.

2C. Agricultural Engineering

PATENT-4 219 964 Not available NTIS
Department of Agriculture, Washington, DC.
Rope Wick Applicator.
Patent,
Jim E. Dale. Filed 13 Dec 78, patented 2 Sep 80, 8p PB81-116733, PAT-APPL-969 036
Supersedes PB-290 545.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A new apparatus and system for the systematic application of liquid chemicals to plants is disclosed. A soft woven nylon rope wick is used to convey chemical solution from a reservoir by means of capillary action. The rope apparatus, which is physically supported, is leveled and positioned to selectively contact certain plants as the wick is moved across an agricultural field.

2E. Animal Husbandry

AD-A090 992/9 PC **A02**/MF **A01**
Walter Reed Army Inst. of Research, Washington, DC.
Acute Gastric Dilatation with Herniation in a Rhesus Monkey.
Final rept.,
William L. Boyce, and Charlotte Miller. 1979, 3p
Pub. in Veterinary Medicine/Small Animal Clinician, p130-131 Jan 80.

No abstract available.

AD-A091 198/2 PC **A02**/MF **A01**
Armed Forces Radiobiology Research Inst., Bethesda, MD.
Protection of Dogs from Lethal Consequences of Endotoxemia with Plasma or Leukocyte Transfusions.
Scientific rept.,
R. I. Walker, John E. French, D. A. Walden, T. J. MacVittie, and G. A. Parker. 1980, 17p Rept no. AFRRI-SR80-15
Pub. in Advances in Shock Research, v4 p89-101 1980.

No abstract available.

AD-A091 348/3 PC **A02**/MF **A01**
Air Force Aerospace Medical Research Lab Wright-Patterson AFB OH
Hemophilia in a Great Pyrenees,
John G. Golden, August R. Banknieder, and Michael E. Bruestle. 1980, 5p Rept no. AFAMRL-TR-80-62
Pub. in Modern Veterinary Practice, p671-674 Aug 80.

No abstract available.

PB81-920800 Standing Order
Food and Drug Administration, Rockville, MD.
FDA Compliance Program Guidance Manual. Section IV. Veterinary Medicine. Updates.
Irregular repts.
1980, approx. 3 issues
Paper copy available on Standing Order, Deposit Account required. North American Continent price $34.00/year; all others write for quote. Single copies also available in paper copy only, price based on page count. Basic report available as PB80-920899.

The standing order allows one to obtain updates to Section IV of the Compliance Program Guidance Manual which provides plans and instructions to Field operations which are surveillance and/or compliance oriented and provide needed direction from Headquarters and Offices and Bureaus in accomplishing FDA's regulatory obligations for veterinary medicines and feeds. This section also includes the concept to the Manual and miscellaneous material relating to compliance functions.

2F. Forestry

AD-A090 898/8 PC **A02**/MF **A01**
Forest Products Lab., Madison, WI.
Wood Anatomy of the Neotropical Sapotaceae. XVIII. Gomphiluma.
Forest service research paper,
B. F. Kukachka. 1980, 6p Rept no. FSRP-FPL-362

As now constituted, Gomphiluma consists of two species of small trees limited to the Brazilian Amazon. Formerly submerged in the large genus Pouteria, Gomphiluma was reinstated to generic status by Aubreville in 1961. The pale brown wood of moderate density is quite unlike that of Pouteria and appears more nearly allied with certain species of Micropholis. (Author)

PB81-121717 PC **A02**/MF **A01**
Northeastern Forest Experiment Station, Broomall, PA.
Uneven-Aged Management of Northern Hardwoods in New England.
Forest Service research paper (Final),
William B. Leak, and Stanley M. Filip. 1975, 22p NEFES/81-127, FSRP-NE-332

Three main aspects of uneven-aged management in northern hardwoods are discussed: (1) choice of cutting method, including selection, group selection, and patch selection; (2) control of yields, which involves the establishment of structural goals, the control of marking operations, and the prediction of allowable harvest; and (3) the transportation or removal of products--truck roads, skidroads, and harvesting precautions.

PB81-121980 PC **A02**/MF **A01**
Northeastern Forest Experiment Station, Broomall, PA.
Raise Cutting Diameters for Increased Returns.
Forest Service research paper (Final),
H. Clay Smith, G. R. Trimble, Jr., and Paul S. DeBald. 1979, 12p NEFES/81-126, FSRP-NE-445

Diameter-limit cutting is widely used to harvest logs in eastern hardwoods. The value of lumber cut from logs is largely dependent on the diameter, grade, and tree species. Studies show that many diameter cutting limits are set so low that they sacrifice financial returns.

PB81-122376 PC **A02**/MF **A01**
Northeastern Forest Experiment Station, Broomall, PA.
Relationship of Species and Site Index to Habitat in the White Mountains of New Hampshire.
Forest Service research paper (Final),
William B. Leak. 1978, 13p NEFES/81-125, FSRP-NE-397

Beech/sugar maple/yellow birch characterize successional stands on the fine tills and the enriched or cove sites. Washed fine till and coarse till are dominated during succession by beech and birch with some red maple. Red maple is abundant on sandy sediments, silty sediments, and dry compact till. Softwoods characterize successional stands on habitats characterized by poor drainage, shallow rock, outwash, and wet compact till. Previous research shows that coarse till, fine till, and enriched sites are the only habitats where pure hardwoods are the climax vegetation.

PB81-123390 PC **A02**/MF **A01**
Rocky Mountain Forest and Range Experiment Station, Fort Collins, CO.
Establishment, Survival, and Growth of Selected Browse Species in a Ponderosa Pine Forest.
Forest Service research paper (Final),
Donald R. Dietz, Daniel W. Uresk, Harold E. Messner, and Lowell C. McEwen. Aug 80, 15p FSRP-RM-219
Color illustrations reproduced in black and white.

Information is presented on establishment, survival, and growth of seven selected browse species in a ponderosa pine forest over a 10-year period. Methods of establishment included hand seeding and planting bare-root and containerized stock. Success of different methods differed with shrub species.

3. ASTRONOMY AND ASTROPHYSICS

3A. Astronomy

AD-A091 325/1 Not available NTIS
Air Force Geophysics Lab., Hanscom AFB, MA.
Angular Diameter of the Asteroids Vesta and Pallas Determined from Speckle Observations,
Simon P. Worden, and Murray K. Stein. 24 May 78, 5p Rept no. AFGL-TR-80-0300
Availability: Pub. in The Astronomical Jnl., v84 n1 p140-142 Jan 79 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A091 328/5 Not available NTIS
Air Force Geophysics Lab., Hanscom AFB, MA.
Reconstructed Images of Alpha Orionis Using Stellar Speckle Interferometry,
Simon P. Worden, C. R. Lynds, and J. W. Harvey. 19 Apr 76, 6p Rept no. AFGL-TR-80-0306
Availability: Pub. in Jnl. of Optical Society of America, v66 n11 p1243-1246 Nov 76 (No copies furnished by DTIC/NTIS). Availability: Microfiche copies only.

No abstract available.

AD-A091 334/3 Not available NTIS
Air Force Geophysics Lab., Hanscom AFB, MA.
Further Speckle Interferometric Studies of Alpha Orionis,
M. Susan Wilkerson, and Simon P. Worden. 26 Oct 76, 5p Rept no. AFGL-TR-80-0305
Availability: Pub. in The Astronomical Jnl., v82 n8 p642-645 Aug 77 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A091 335/0 Not available NTIS
Air Force Geophysics Lab., Hanscom AFB, MA.
Interferometric Determinations of Asteroid Diameters,
S. P. Worden. 1979, 14p Rept no. AFGL-TR-80-0257
Availability: Pub. in Asteroids, p119-131 Dec 79 (No copies furnished by DTIC/NTIS).

No abstract available.

3B. Astrophysics

AD-A091 103/2 PC **A02**/MF **A01**
Air Force Geophysics Lab., Hanscom AFB, MA.
Solar Rotation Studies Using Sunspot Data (1967-1974),
Donald F. Neidig. 10 Sep 79, 8p Rept no. AFGL-TR-80-0304
Pub. in Solar Physics, v66 p205-211 1980.

No abstract available.

AD-A091 104/0 PC **A02**/MF **A01**
Air Force Geophysics Lab., Hanscom AFB, MA.
The Application of Multivariate Discriminant Analysis to Solar Flare Forecasting,
Joseph W. Hirman, Donald F. Neidig, Paul H. Seagraves, William E. Flowers, and Philip H. Wiborg. 1980, 14p Rept no. AFGL-TR-80-0301
Pub. in Solar-Terrestrial Predictions Proceedings. Vol. 3. Solar Activity Predictions, NOAA, Boulder, CO., pC64-C75 Mar 80.

No abstract available.

AD-A091 326/9 PC **A03**/MF **A01**
Joint Inst. for Lab. Astrophysics, Boulder, CO.
Stellar Model Chromospheres. X. High-Resolution, Absolute Flux Profiles of the Ca II H and K Lines in Stars of Spectral Types F0-M2,
Jeffrey L. Linsky, S. P. Worden, W. McClintock, and Robert M. Robertson. 20 Nov 78, 30p AFGL-TR-80-0302
Contracts NAS5-23274, NGL-06-003-057
Pub. in The Astrophysical Jnl. Supplement Series, V41 p47-74 Sep 79. See also AD-A083 858.

No abstract available.

AD-A091 327/7 Not available NTIS
Air Force Geophysics Lab., Hanscom AFB, MA.
The Lifetimes of Sunspot Moats,
Lindsey Pardon, Simon P. Worden, and Timothy J. Schneeberger. 9 Apr 79, 5p Rept no. AFGL-TR-80-0298
Availability: Pub. in Solar Physics, v63 p247-250 Sep 79 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A091 329/3 Not available NTIS
Air Force Geophysics Lab., Hanscom AFB, MA.
Impulsive Phase of Solar Flares,
Sharad R. Kane, C. J. Crannell, D. Datlowe, U. Feldman, and A. Gabriel. 1980, 44p Rept no. AFGL-TR-80-0303
Availability: Pub. in Solar Flares, p187-229 Jun 80 (No copies furnished by DTIC/NTIS). Microfiche copies only.

No abstract available.

AD-A091 331/9 PC **A02**/MF **A01**
Air Force Geophysics Lab., Hanscom AFB, MA.
Anatomy of a Spiral Galaxy,
Raymond J. Talbot, Jr., Eric B. Jensen, and Reginald J. Dufour. 1980, 7p Rept no. AFGL-TR-80-0255
Pub. in Sky and Telescope, v60 p23-28 Jul 80.

No abstract available.

AD-A091 332/7 PC **A02**/MF **A01**
Air Force Geophysics Lab., Hanscom AFB, MA.
Observations of Coronal Oscillations Above an Active Region,
Thomas F. Egan, and Timothy J. Schneeberger. 14 Jun 79, 7p Rept no. AFGL-TR-80-0280
Pub. in Solar Physics, v64 p223-228 1979.

No abstract available.

AD-A091 333/5 Not available NTIS
Air Force Geophysics Lab., Hanscom AFB, MA.
Anomalous Satellite Drag and the Green-Line Corona,
Richard C. Altrock. 1979, 5p Rept no. AFGL-TR-80-0276
Availability: Pub. in Solar Terrestrial Predictions Proceedings, v4 pE1-E4 Mar 80 (No copies furnished by DTIC/NTIS).

No abstract available.

INIS-mf-5608 PC **A08**/MF **A01**
Amsterdam Univ. (Netherlands).
Space Distribution and Physical Properties of Cool Dwarf Stars.
Proefschrift (Dr.),
R. F. A. Staller. 19 Sep 79, 170p
U.S. Sales Only.

A new study of the space density of red dwarfs based on a sample of red dwarfs in a field of 238 square degrees towards the South Galactic Pole is presented. A blink survey using red and blue copies of Mount Palomar Sky Survey plates of a six square degrees field centered on the South Galactic Pole was performed, and the results (approximately 2500 red objects) and the discussion of these results are presented. The time that elapsed before a black dwarf becomes invisible is estimated and it is suggested that low-velocity red dwarfs could be explained by contracting black dwarfs. On the basis of theoretical considerations it can be shown that the existence of a large number of low-velocity stars is in serious conflict with criteria for the stability of the galactic disk. It is shown that if one also takes into account all generations of black dwarfs that are already invisible and therfore old, the mean velocity of all black dwarfs is much higher so that there is no conflict with theory. Luminosity functions of red and black dwarfs in several photometric passbands are calculated. (Atomindex citation 11:515709)

N81-10901/9 PC **A02**/MF **A01**
California Inst. of Tech., Pasadena.
The Formation of a T Tauri Star: Observations of the Infrared Source in L 1551.
S. Harris, and C. Beichman. 1980, 19p NASA-CR-163667
Contract NGL-05-002-207

The 5 to 25 micron observations show that an object previously discovered at 2.2 microns (IRS 5) within the densest part of the L1551 dark cloud is a strong source of radiation from grains as cool as 230 K. The energy distribution resembles that of infrared objects embedded within other molecular cloud cores, but implies a total solar luminosity of only 30. The luminosity of the source and its proximity to other T Tauri stars suggests that it is a 1 to 2 solar mass pre-main sequence star still swaddled within the L1551 cloud. The radio and optical evidence for mass motions around IRS 5 may mean that IRS 5 has been flaring in FU Ori-type eruptions within the last 1000 years.

N81-10902/7 PC **A03**/MF **A01**
Cambridge Univ. (England). Inst. of Astronomy.
Activities of the Institute of Astronomy, 1978 to 1979.
Annual Report.
1980, 36p

Observational work on quasars and galaxies, stars and star clusters was reviewed. Theoretical studies were continued in galaxy clustering, galaxy formation, and cosmology, galactic structure and dynamics, as well as on star clusters, stellar structure and evolution, galactic nuclei, compact objects,

the Sun and solar system. Improvements in instrumentation are listed.

PB81-124950 PC **A04**/MF **A01**
National Geophysical and Solar-Terrestrial Data Center, Boulder, CO.
Solar-Geophysical Data Number 432, Ausust 1980. Part II (Comprehensive Reports). Data for February 1980 and Miscellanea,
Helen E. Coffey. Aug 80, 52p SGD-432-PT-2, NOAA-80100806
See also Number 431, Part 2, PB81-110035.

In addition to an index for 1979-1980, this issue of comprehensive reports provides data for February 1980 on: solar radio emission, energetic solar particles and plasma, and solar x-ray radiation. Miscellaneous data consists of: Energetic solar particles and plasma for January 1980 and November 1979, Active Regions Nov 3-Dec 27, 1979, and Synoptic Solar Maps Nov 3-Dec 27, 1979.

PB81-124968 PC **A08**/MF **A01**
National Geophysical and Solar-Terrestrial Data Center, Boulder, CO.
Solar-Geophysical Data Number 432, August 1980. Part I (Prompt Reports). Data for July 1980 - June 1980 and Late Data,
Helen E. Coffey. Aug 80, 173p SGD-432-PT-1, NOAA-80100805
See also Volume 431, Part 1, PB81-110017.

In addition to an index for 1979-1980, this prompt report provides data for July 1980 on: alert periods, daily solar indices, solar flares, solar radio emission, solar wind measurements, coronal holes, spacecraft observations, inferred interplanetary magnetic field polarities, mean solar magnetic field and Boulder Geomagnetic Substorm Log. It also provides data for June 1980 on daily solar activity centers, sudden ionospheric disturbances, spacecraft observations, solar radio emission, cosmic rays, geomagnetic indices, and radio propagation indices. Late data included in this issue presents solar radio emission June 1980, coronal holes, and cosmic rays Deep River/Alert May 1980.

PPPL-1704 PC **A02**/MF **A01**
Princeton Univ., NJ. Plasma Physics Lab.
Toroidal Plasma Equilibrium with Gravity.
S. Yoshikawa. Sep 80, 22p
Contract AM02-76CH03073

Toroidal magnetic field configuration in a gravitational field is calculated both from a simple force-balance and from the calculation using magnetic surfaces. The configuration is found which is positionally stable in a star. The vibrational frequency near the equilibrium point is proportional to the hydrostatic frequency of a star multiplied by the ratio (W/sub B/ /W/sub M/)/sup 1/2/ where W/sub B/ is the magnetic field energy density, and W/sub M/ is the material pressure at the equilibrium point. It is proposed that this frequency may account for the observed solar spot cycles. (ERA citation 05:035668)

3C. Celestial Mechanics

N81-10909/2 PC **A02**/MF **A01**
College of William and Mary, Williamsburg, VA. Dept. of Mathematics and Computer Science.
Dynamics of Collisionless Systems.
Final Technical Report, Oct. 1978 - Aug. 1980.
T. A. Zang. Aug 80, 11p NASA-CR-163234
Grant NSG-1564

The three dimensional dynamics of rotating stellar systems were studied. A comparison of various mathematical models of flat galaxies is presented. The effects of self-gravity upon a flat galaxy undergoing a tidal encounter with another galaxy were investigated.

4. ATMOSPHERIC SCIENCES

4A. Atmospheric Physics

AD-A090 910/1 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
VHF and UHF Radar Observation of Equatorial F Region Ionospheric Irregularities and Background Densities.
Journal article,
David M. Towle. 21 Mar 79, 17p JA-4952, ESD-TR-80-50
Contract F19628-80-C-0002
Pub. in Radio Science, v15 n1 p71-86 Jan-Feb 80.

No abstract available.

AD-A090 911/9 Not available NTIS
Defence Research Establishment Valcartier (Quebec).
Multiple Scattering Corrections for Atmospheric Aerosol Extinction Measurements,
W. G. Tam. 29 Feb 80, 4p DRB-REPRINT-4251
Availability: Pub. in Applied Optics, v19 n13 p2090-2092, 1 Jul 80 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A091 128/9 PC **A02**/MF **A01**
Stanford Univ., CA. Inst. for Plasma Research.
Possible Influence of Solar Rotation on Tropospheric Circulation.
Technical rept.,
John M. Wilcox. Sep 80, 20p Rept no. SU-IPR-818
Contracts N00014-76-C-0207, NAS5-24420
Sponsored in part by Grants NASA-NGR05-020-559 and NSF-ATM77-20580. Presented at the Sun and Climate Conference, 30 Sep-3 Oct 80, Tolouse Space Center (France).

A large-scale structure observed in the photospheric magnetic field is carried out into the helicopter by the solar wind. At earth the resulting interplanetary magnetic field has polarity away from the sun for several consecutive days followed by an abrupt reversal and several days with field polarity toward the sun. This section structure appears to be related to some effects in the tropospheric circulation. (Author)

AD-A091 169/3 PC **A03**/MF **A01**
SRI International, Menlo Park, CA.
Spectral Characteristics of Medium-Scale Equatorial F-Region Irregularities.
Topical rept. 1 Jan-29 Feb 80,
Robert C. Livingston, and Charles L. Rino. 1 Mar 80, 37p DNA-5311T
Contract DNA001-80-C-0077

The spectral characteristics of equatorial F-region irregularities with scale sizes from a few kilometers to several hundred kilometers have been measured using data from the Atmospheric Explorer-E (AE-E) satellite. The spectra admit the expected power-law characterization with a mean spectral index slightly less than 2. The spectral index, p1, however, decreases with increasing perturbation strength. The same data have been compared with nearly simultaneous phase scintillation data from the Wideband satellite. The power-law index of the phase scintillation data varies with perturbation strength in exactly the same manner as does p1. With realistic propagation model parameters, the scintillations-inferred perturbation levels can be made to match those measured in-situ. However, the long-accepted unity separation between the in-situ and phase spectral indices is not observed. This discrepancy is attributed either to shortcomings in the theory or to lack of temporal/spatial comparability of the two measurements. (Author)

AD-A091 330/1 Not available NTIS
Air Force Geophysics Lab., Hanscom AFB, MA.
User Requirements of Solar-Terrestrial Predictions for Spacecraft Applications,
A. L. Vampola, R. Altrock, W. Atwell, R. C. Backstrom, and H. B. Garrett. 1979, 22p Rept no. AFGL-TR-80-0282
Availability: Pub. in Solar Terrestrial Proceedings, v2 p1-20 Dec 79 (No copies furnished by DTIC/NTIS). Microfiche copies only.

No abstract available.

AD-A091 337/6 PC **A02**/MF **A01**
Air Force Geophysics Lab., Hanscom AFB, MA.
Electrodynamic Structures in the Polar Cap during a Period of Geomagnetic Quieting,
W. J. Burke, M. S. Gussenhoven, F. J. Rich, D. A. Hardy, and M. Smiddy. 1979, 5p Rept no. AFGL-TR-80-0292
Pub. in Proceedings of Chapman Conference on High Latitude Electric Field, p23-1-23-3, 30 Jan-2 Feb 80.

No abstract available.

AD-A091 363/2 PC **A02**/MF **A01**
University of Southern California, Los Angeles. Dept. of Aerospace Engineering.
The Gravitational Collapse of a Mixed Region into a Linearly Stratified Fluid,
R. Amen, and T. Maxworthy. 20 Oct 78, 20p
Contract N00014-76-C-0211
Pub. in Jnl. of Fluid Mechanics, v96 pt1 p65-80 1980.

No abstract available.

N81-10616/3 PC **A12**/MF **A01**
Illinois Univ., Urbana. Aeronomy Lab.
Ion and Electron Temperatures in the Topside Ionosphere.
D. E. Munninghoff. 1 Apr 79, 269p NASA-CR-163670, UILU-ENG-79-2505
Contracts NSF ATM-75-15523, NSF ATM-77-06787

Experimental and theoretical ion and electron temperatures in the topside ionosphere were investigated. Experimental results came from an analysis of incoherent scatter data taken at Arecibo, Puerto Rico. Consideration of the energy balance equations gave the theoretical ion and electron temperatures.

N81-10623/9 PC **A05**/MF **A01**
Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt e.V., Oberpfaffenhofen (Germany, F.R.).
Results on the Radiation Budget of the Tropical Atmosphere from Measurements Made on Hemispherical Radiant Flux Densities in the Visible Spectral Range During the Atlantische Experiment in 1969.
H. Queck. Oct 79, 94p DFVLR-FB-79-36
Contract DFG-MU-85/27
In German; English Summary.

Some sixty-seven radio sondes carried aboard the German vessels, Meteor and Planet, and the American vessel, Discoverer, were employed. Measurements were centered about 550 and 684 nm. Radiant flux densities are given as a function of height for both hemispheres. Frequency distributions are presented together with the different components of the radiation balance (absorption, refection, and transmission). The resulting spectral heating rates are also given.

N81-10648/6 PC **A03**/MF **A01**
Foersvarets Forskningsanstalt, Stockholm (Sweden).
Investigations of the Meteorological Influence on Aerosol Transmission in the 0.5 - 14 Micrometer Wavelength Range.
A. Haagaard, B. Nilsson, and H. Ottersten. Apr 80, 26p FOA-C-301-82-E1-E3
Presented at Ifaors Workshop on Atmospheric Aerosols: Their Formation, Optical Properties and Effects, Baltimore, 6-8 Nov. 1979.

In a theoretical model, based on Mie theory, the aerosol extinction is derived from particle size distribution and refractive index. A profound weather influence on the wavelength dependence of the aerosol extinction was evident from the model. Verification and modification of the model was based on transmission measurements along a horizontal path. Every 10 min for 15 months of automatic operation the transmissometer provided extinction values in 15 bands in the 0.5 - 14 micrometer wavelength interval, along with surface data from meteorological sensors. After subtraction of the water vapor extinction, calculated from surface data with the Lowtran program, the aerosol extinction was obtained.

PB81-116014 PC **A04**/MF **A01**
Illinois Univ. at Urbana-Champaign. Lab. for Atmospheric Research.
Modeling the Evolution of the Convective Planetary Boundary Layer.
Final rept.,
Wen-Yih Sun, and Yoshi Ogura. Feb 80, 54p
NOAA-80091904
Grant NOAA-04-7-022-44026

The Level 3 turbulence closure model is modified (a) to incorporate the formulations for the turbulence third order moments and pressure terms proposed by Zeman and Lumley (1976) and (b) to introduce turbulence length scales which depend upon the stratification of the atmosphere. The vertical heat and moisture fluxes and the temperature-humidity covariance are determined from differential equations. The model includes two other differential equations, one for the turbulence kinetic energy and the other for virtual potential temperature variance. All other turbulence variables are determined from algebraic equations. The model is used to simulate the daytime evolution of the planetary boundary layer observed on day 33 of the Wangara boundary layer experiment.

UCRL-84058 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Increases in CO sub 2 and Chlorofluoromethanes: Coupled Effects on Stratospheric Ozone.
J. E. Penner. 18 Aug 80, 9p CONF-800869-1
Contract W-7405-ENG-48
Quadrennial international ozone symposium, Boulder, CO, USA, 4 Aug 1980.

The magnitude of the chlorofluoromethane (CFM) induced depletion of the ozone layer is considered a key problem in atmospheric research. The historical rise in the atmospheric concentrations of CFCl sub 3 , and CF sub 2 Cl sub 2 , the major CFM species, is well documented. Atmospheric CO sub 2 has also been increasing. Instead of depleting O sub 3 , the expected effect of CO sub 2 is to increase its concentration. The simultaneous effects of these perturbations were studied. Results indicate that increases in CO sub 2 can significantly alter the predicted ozone trend. This will complicate efforts to detect the trend in O sub 3 caused by increases in CFM's. Since the calculated effects of these perturbations are largest at high altitudes, one might expect to detect changes in high altitude O sub 3 sooner than those in total O sub 3 . Therefore a comparison was made between the calculated change in O sub 3 at high altitude and statistical detection limits for abnormal change as developed from Umkehr data from Arosa, Switzerland. Its significance for trend detection is discussed. Finally, since CO sub 2 effects will be important in the next 50 to 100 years, the effects of temperature changes from CO sub 2 increase on O sub 3 loss rates from different families were examined. Significant changes in the NO/sub x/-catalyzed ozone loss rates that have not previously been discussed were found. It is concluded that the O sub 3 decrease at steady state from the coupled CFM and CO sub 2 perturbation is larger than the decrease calculated by summing the separate effects of these perturbations. The expected increase in CO sub 2 can significantly affect predicted O sub 3 trends in the next 50 to 100 years. O sub 3 changes in Umkehr level 7 are more detectible, in a statistical sense, than those at higher levels. The temperature effect of CO sub 2 on the NO/sub x-catalyzed O sub 3 destruction rate was found to be as large or larger than the effect of temperature on the pure oxygen loss rate. (ERA citation 05:037141)

4B. Meteorology

AD-A090 877/2 Not available NTIS
Maryland Univ., College Park. Dept. of Meteorology.
The Albedo of a Tropical Evergreen Forest,
R. T. Pinker, O. E. Thompson, and T. F. Eck. 31 May 79, 9p ARO-13660.1-GS
Grant DAAG29-76-G-0292
Availability: Pub. in Quarterly Jnl. of the Royal Meteorological Society, v106 n449 p551-558 Jul 80 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A091 102/4 PC **A02**/MF **A01**
Air Force Geophysics Lab., Hanscom AFB, MA.
The Night Sky Conditions at the Sacramento Peak Observatory. II. Cloud Cover, Seeing, and Precipitable Water,
Jacques M. Beckers, William O. Breedlove, Howard L. DeMastus, Paul G. N. DeVegvar, and Ellis E. Johansen. 31 Jul 79, 5p Rept no. AFGL-TR-80-0299
Pub. in Publications of the Astronomical Society of the Pacific, v91 p857-860 Dec 79. See also AD-A081 699.

No abstract available.

AD-A950 062/0 PC **A03**/MF **A01**
Central Intelligence Agency, Washington, DC.
Ceylon. Section 23. Weather and Climate.
National intelligence survey no. 37.
Apr 54, 36p
Includes envelope with map. Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

No abstract available.

AD-A950 063/8 PC **A05**/MF **A01**
Central Intelligence Agency, Washington, DC.
Burma. Section 23. Weather and Climate. Revision.
National intelligence survey no. 38.
Jan 67, 88p
Revision of report dated Jul 52. Original contains color plates: All DTIC and NTIS reproductions will be in black and white. Includes envelope with map.

No abstract available.

AD-A950 064/6 PC **A04**/MF **A01**
Central Intelligence Agency, Washington, DC.
Equatorial Africa. Section 23. Weather and Climate.
National intelligence survey no. 52.
Oct 55, 55p
Includes envelope with map. Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

No abstract available.

AD-A950 065/3 PC **A05**/MF **A01**
Central Intelligence Agency, Washington, DC.
Ethiopia and the Somalilands. Section 23. Weather and Climate. Revision.
National intelligence survey no. 55.
Apr 65, 80p
Revision of report dated May 50. Includes envelope with map. Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

No abstract available.

AD-A950 066/1 PC **A04**/MF **A01**
Central Intelligence Agency, Washington, DC.
Indian Ocean Islands. Section 23. Weather and Climate.
National intelligence survey no. 63.
Aug 59, 58p
Includes envelope with map. Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

No abstract available.

AD-A950 067/9 PC **A05**/MF **A01**
Central Intelligence Agency, Washington, DC.
Libya. Section 23. Weather and Climate. Revision.
National intelligence survey no. 49.
Jul 65, 92p
Includes envelope with map. Revision of report dated Sep 49. Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

No abstract available.

AD-A950 068/7 PC **A05**/MF **A01**
Central Intelligence Agency, Washington, DC.
U.S.S.R.-I. European U.S.S.R. Section 23. Weather and Climate.
National intelligence survey no. 26-1.
Dec 52, 79p
Includes envelope with map. Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

No abstract available.

AD-A950 069/5 PC **A04**/MF **A01**
Central Intelligence Agency, Washington, DC.
U.S.S.R.-II. Soviet Central Asia. Section 23. Weather and Climate.
Apr 49, 66p
Includes envelope with map. Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

No abstract available.

AD-A950 070/3 PC **A05**/MF **A01**
Central Intelligence Agency, Washington, DC.
Anglo-Egyptian Sudan. Section 23. Weather and Climate.
National intelligence survey no. 54.
Jul 49, 85p
Includes envelope with map. Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

No abstract available.

DOE/ET/20537-1 PC **A04**/MF **A01**
SRI International, Menlo Park, CA.
Numerical Study of Local/Regional Atmospheric Changes Caused by a Large Solar Central Receiver Power Plant. Final Report, 29 September 1978-31 May 1980.
C. M. Bhumralkar, A. J. Slemmons, and K. C. Nitz. May 80, 72p
Contract AT03-76ET20537

A two-dimensional, vertical cross-section, numerical atmospheric mesoscale model has been applied to study the potential local/regional atmospheric effects of the installation of a 100 MW/sub e/ solar thermal central receiver power plant at Barstow, California. The model can simulate the changes in surface characteristics associated with the installation of heliostats and other power plant ancilliaries, and can simulate the effects of waste heat from cooling towers. The model equations have been integrated to simulate typical summer, atypical summer, and typical winter conditions. The results for typical summer conditions at Barstow and the surrounding region show that the power plant has the potential to increase local humidity and wind circulation but cannot induce the formation of clouds or rain. The results for atypical summer conditions show that the solar power plant has the potential to increase the wind circulation and to form clouds and rain. However, the life cycle of such formations is only 2 to 3 hours. The results for typical winter conditions do not indicate significant atmospheric perturbations as a result of solar power plant installation. Sensitivity to the type and location of cooling tower has been tested and described. The atmospheric effects of a dry cooling tower located upwind are not as significant and intense as those produced using a wet cooling tower. The effect of a wet cooling tower located at the downwind edge of the power plant is an increase in humidity in the downwind portion of the model atmosphere. The effects of solar-power plant-induced atmospheric changes on the performance and design of the power plant itself have also been examined and are shown to be significantly affected in atypical conditions. (ERA citation 05:036290)

DOE/EV-T0002/1 PC **A03**/MF **A01**
Department of Energy, Washington, DC. Office of Health and Environmental Research.

Summary of the Carbon Dioxide Effects Research and Assessment Program.
Jul 80, 34p

A brief management-oriented summary is presented of the research program. Goals, strategies, selected facts and predictions are presented. (ERA citation 05:037146)

DOE/EV-0094 PC **A05**/MF **A01**
Department of Energy, Washington, DC. Office of Health and Environmental Research.
Carbon Dioxide Effects Research and Assessment Program. A Comprehensive Plan. Part I. The Global Carbon Cycle and Climatic Effects of Increasing Carbon Dioxide.
Aug 80, 97p

Initial plans for research of the carbon dioxide (CO sub 2) and climate issue were prepared in 1978 and were reviewed extensively at that time by federal agencies and members of the scientific community. Since then the plans have been used to guide early phases of the Department of Energy's and the nation's efforts related to this issue. This document represents a revision of the 1978 plan to (a) reflect recent ideas and strategies for carbon cycle research, and (b) expand the scope of research on climatic responses to increasing atmospheric concentrations of CO sub 2 . The revised plan takes into account a number of investigations already being supported by various agencies, and it attempts to build on or add to existing research where there is a crucial need for information directly related to the CO sub 2 issue. It should be recognized that this document is the first section of a comprehensive plan on the overall consequences of increasing concentrations of CO sub 2 , and includes guidelines for research on the Global Carbon Cycle and Climatic Effects of Increasing CO sub 2 . (ERA citation 05:035387)

LA-UR-80-1995 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Simple Model for Wind Field Computation from Sparse Data.
W. H. Lee. 1980, 6p CONF-801107-15
Contract W-7405-ENG-36
ANS international conference, Washington, DC, USA, 17 Nov 1980.

An initial attempt to carry out a simple numerical model that will interpolate and smooth the complete wind fields for an arbitrary planar region where only sparse wind data are available is summarized. The model contains four features: any arbitrary planar region with curved or straight line boundaries that do not cross themselves can be treated; the measured wind data can be irregularly distributed in the region; part of the code can be applied to any function that has two independent variables; and irrotational flow is assumed in smoothing the stream function. (ERA citation 05:037140)

N81-10637/9 PC **A07**/MF **A01**
National Aeronautics and Space Administration, Huntsville, AL. George C. Marshall Space Flight Center.
First Scientific Working Group Meeting of Airborne Doppler Lidar Wind Velocity Measurement Program.
J. W. Kaufman. Oct 80, 135p NASA-CP-2161
Meeting Held in Huntsville, Ala., 25-26 Aug. 1980.

No abstract available.

N81-10649/4 PC **A05**/MF**A01**E
World Meteorological Organization, Geneva (Switzerland).
Manual on the Global Observing System. Volume 1: Annex 5 to the WMO Technical Regulations - Global Aspects.
1980, 82p WMO-544-V-1, ISBN-92-63-10544-8

Regulatory material for the global and regional aspects of the system is presented. The regulations stem from recommendations of the commission for basic systems and resolutions of regional associations, as well as from decisions taken by Congress and the executive committes. The main chapters are: organization of the Global Observing System; requirements for observational data; surface based subsystem, space-based subsystem, reduction of level one data, quality control, and monitoring of the World Weather Watch.

N81-10650/2 PC **A11**/MF **A01**
World Meteorological Organization, Geneva (Switzerland).
Activities of the World Meteorological Organization for 1979.
Annual Report.
1980, 226p WMO-552, ISBN-92-63-10552-9

Activities in the following six program areas are described: World Weather Watch; the research and development; meteorological applications and environment; hydrology and water resources development; technical cooperation; and education and training. Other technical and supporting activities are outlined, including administrative and legal matters.

PB81-124653 PC **A09**/MF **A01**
National Center for Atmospheric Research, Boulder, CO.
Air Motions in a Rotating Spheroidal Shell.
Technical note,
Max Margules. Oct 80, 183p NCAR/TN-156
Grant NSF-ATM77-23757
Trans. of three Austrian papers on atmospheric oscillations by Max Margules.

This report comprises translations of three papers by Max Margules on atmospheric oscillations.

PB81-124927 PC **A02**/MF **A01**
National Environmental Satellite Service, Washington, DC.
Publications and Final Reports and Contracts and Grants, 1979.
Technical memo.,
Catherine M. Frain. Mar 80, 14p NOAA-TM-NESS-108, NOAA-80101004
See also report dated 1978, PB80-122385.

Publications by staff members of the National Environmental Satellite Service for the year 1979 are listed as well as the names of final reports on contracts and grants sponsored by NESS during 1979.

5. BEHAVIORAL AND SOCIAL SCIENCES

5A. Administration and Management

AD-A090 835/0 PC **A10**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH.
The Pros and Cons of National Defense: A Study of the Proponents, Opponents, Issues, and the Public Affairs and Public Relations Programs Surrounding the B-1 Strategic Bomber.
Masters thesis,
James H. Ragan. Aug 79, 213p Rept no. AFIT-CI-79-185T

The thesis outlined here was written as part of the candidacy requirements for a Masters of Science Degree in Public Relations at the American University, Washington, D.C. in August 1979. Length is 203 pages. Written as a broad overview of the public affairs and public relations efforts surrounding the B-1, the paper contains an historical chapter on how the B-1 developed as an issue and the public affairs/public relations programs devised in support of the aircraft. Air Force public affairs activities and Rockwell International public relations efforts are reviewed separately and are discussed using the four-step public relations problem solving process found in Effective Public Relations by Scott Cutlip and Allen Center. A content analysis of a New York Times abstract of B-1 stories reported in that paper is included in a separate chapter. The analysis was designed to determine what issues were raised, both pro and con, about the B-1; the month in which the stories were printed; their page placement within the paper; and the spokespersons for the issues. The abstract was obtained from the New York Times Information Bank. Based upon the reviewed material and the content analysis, conclusions and recommendations are offered in the last chapter. (Author)

AD-A090 946/5 PC **A18**/MF **A01**
Institute for Defense Analyses, Arlington, VA. International and Social Studies Div.
Analytical Support for the Joint Chiefs of Staff: The WSEG Experience, 1948-1976,
John Ponturo. Jul 79, 414p IDA-S-507, IDA/HQ-19569
Contract MDA903-79-C-0018

This study analyzes the activities of the Weapons Systems Evaluation Group (WSEG) in providing operational analyses and weapons systems evaluations to the Joint Chiefs of Staff (JCS) from 1948 to 1976. The purpose of the analysis is twofold: (1) to assess the factors that affected WSEG's usefulness as a source of analytical support for the JCS; and (2) to derive lessons from the WSEG experience that may be of value in providing for such support in the future. In reviewing the WSEG record for these purposes, the study considers WSEG's organization, working arrangements, task assignments, operating procedures, and study production, in the context of the circumstances and requirements of the particular period. Under the terms of the task directive, the study covers WSEG's functions and the nature of their accomplishment, but does not attempt to evaluate either the quality of WSEG studies or their impact on JCS or Department of Defense (DoD) decisions.

AD-A091 030/7 PC **A07**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH.
Computer Applications for Air Force Construction Management.
Master's thesis,
David Van Henrichsen. Aug 79, 137p Rept no. AFIT-CI-79-198T

The application of computers to construction management is discussed with emphasis on Air Force construction management. Three basic areas of computer knowledge are covered: computer development, computer application to private construction management, and computer application to Air Force construction management. An overview of the development of the computer illustrates the problems and various factors present in the acceptance and application of the computer from initial discovery, through its technological advancements, to the microcomputer of the seventies. A discussion of computer applications in the construction phases includes examples from a basic construction-oriented computer program, ICES PROJECT-I. Air Force construction management is analyzed through various levels of management organization determined by project size and complexity. Actual computer applications at these levels are analyzed on the basis of interviews, regulatory documents, and an overview of a construction management computer program utilized by the Air Force. Conclusions and recommendations are given with the purpose of enhancing the Air Force construction management program. (Author)

AD-A091 057/0 PC **A10**/MF **A01**
Naval Postgraduate School, Monterey, CA.
An Analysis of Current Organizational Development Efforts in the United States Coast Guard.
Master:s thesis,
Clifford Lee Samuel. Sep 78, 222p

The Coast Guard, like the Department of Defense services, is faced with the problems of systemwide social change and the need to manage the integration of individual and organizational goals. A comparative/descriptive analysis of preliminary and institutionalized OD efforts by the various U.S. Armed Forces to respond to these social pressures is presented. The purpose of this study is to provide inputs and recommendations for general policy use by the Coast Guard planners, in light of

the Defense Services' efforts, regarding the feasibility, establishment, and management of a Coast Guard OD Program.

AD-A091 160/2 PC **A08**/MF **A01**
International Technology Corp Satellite Beach FL
Contract Incentives for Product Quality.
Final rept. 14 Aug 79-1 Jun 80.
Jun 80, 168p
Contract F33615-79-C-5067

The Air Force has historically tried to control quality during the acquisition of major weapon systems. This study was performed to examine Air Force contracting and acquisition techniques utilized to assure the quality and reliability of weapon systems. The principal thrust of the study was to examine the general motivational aspects of the USAF contracting techniques relating to quality and reliability. The researcher examined current quality/reliability policy, conducted interviews, and used a questionnaire to evaluate and ascertain the effectiveness of the current quality/reliability policy. (Author)

AD-A091 208/9 PC **A03**/MF **A01**
Army Combined Arms Studies and Analysis Activity, Fort Leavenworth, KS.
Unit Reference Sheet (URS) Cost Methodology.
Final rept.,
Harry P. Levitt. Aug 80, 44p Rept no. CASAA-TP-2-80

This paper describes the development of force costing based on the Unit Reference Sheet (URS) level of organizational detail. Force costing using this methodology will increase the capability to provide rapid response comparative force costing information, negating the requirement to develop detailed Automated Unit Reference Sheets (AURS) for costing. The development of AURS can be scheduled at the end of a force tradeoff study when the definition of the specific organizational requirements becomes firm. Appendix contains a list of current equipment cost drivers. (Author)

AD-A091 212/1 PC **A02**/MF **A01**
Center for Naval Analyses, Alexandria, VA.
Adequate Classification Guidance - A Solution and a Problem.
Professional paper,
Jack Robinson. Aug 80, 14p Rept no. CNA-PP-289

This paper addresses Classification Management--Training and Operations. It deals at some length with the foundation for classification. The hierarchical nature of classification determinations is discussed. The effect that official issuance at a high level have on those who are at subordinate levels is illustrated. A solution suggested was that classification guidance should become more complete and more pervasive, so that compounded errors would disappear from the scene.

AD-A091 379/8 PC **A03**/MF **A01**
International Technology Corp Satellite Beach FL
USAF Acquisition Managers Quality Guide.
Final rept. 14 Aug 79-1 Jun 80.
Jun 80, 44p
Contract F33615-79-C-5067

This guidance document is to aid USAF R&D managers, contracting officers, and acquisition managers who are involved in the procurement of defense material by providing information that will help assure that the products being acquired will satisfy the requirements of those who will use the equipment. This quality guide is intended to be an adjunct to other existing policies and procedures and will provide a conceptual framework and basis for understanding the quality role in relation to specific contractual language. It is also designed to illustrate the product quality is an all encompassing concern and numerous organizational elements contribute to overall product quality. (Author)

ANL/SPG-12 PC **A08**/MF **A01**
Argonne National Lab., IL.
Benefits and Costs of Load Management: A Technical Assistance and Resource Material Handbook.
Jun 80, 160p
Contract W-31-109-ENG-38

This handbook will assist state regulatory authorities and electric utilities in complying with the Load Management Standard of the Public Utility Regulatory Policies Act of 1978. The handbook has two major sections. The first discusses load-management techniques in terms of equipment, customer applications, combinations of techniques, etc. Key steps for evaluating the costs and benefits of load management options also are presented. These steps are intended to sequentially eliminate ineffective load-management options as the cost-benefit calculation becomes more detailed. The second section includes up-to-date information on available load-management technologies, models for utility costing, load-management data transfer, prescreening of load-management options, and the load-management literature. (ERA citation 05:036756)

ANL/SPG-7 PC **A03**/MF **A01**
Argonne National Lab., IL.
Appropriateness of a Load-Management Agreement as the Rate Format for Customer Thermal Storage: Why a Closeout Sale on off-Peak Electricity Should Be Adopted.
S. H. Nelson. Mar 80, 34p
Contract W-31-109-ENG-38

This report demonstrates why a load-management agreement is the best rate format for customer thermal energy storage (TES) from electricity. The first section presents the basic operating and cost characteristics of TES systems as well as potential problems that affect rate setting. Then, the criteria for choosing a rate structure are put forth, and the various rate formats available are analyzed considering the above information. Finally, the means of achieving the maximum social benefits using a load-management agreement are explored. (ERA citation 05:036755)

ED-181 904 Not available NTIS
Ohio State Univ., Columbus. Computer and Information Science Research Center.
Department of Computer and Information Science, The Ohio State University's Annual Report, July 1978-August 1979.
Aug 79, 60p
For related document, see ED-171 275.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

This annual report contains a summary of the research which has been carried on in the department during the 1978-1979 academic year, and information about its organizational structure objectives, instructinal programs, computing facilities, interaction within the university, and interaction with the computer and information science community. Summaries of four completed research projects are included, and 12 ongoing research grants are described. Research was supported in part by grants from government agencies and industry, as well as by the Ohio State University. Appendices include listings of courses by number and title, computer and information science faculty, the computer and information science seminar series, related departmental activities, publications of the department staff, a technical report series, and recipients of the Doctor of Philosophy degree.

PB81-111833 PC **A05**/MF **A01**
General Accounting Office, Washington, DC. Community and Economic Development Div.
Promising Changes Improve EPA's Extramural Research; More Changes Needed.
28 Oct 80, 97p CED-81-6

The Environmental Protection Agency's annual research and development appropriations for fiscal years 1978-80 averaged $336 million, about 70 percent of which has been spent on research conducted under contracts, grants, and cooperative agreements. Congressional hearings, external studies, and EPA's own studies have shown that EPA was not receiving the sound scientific information it needs. In the last few years, EPA has changed its research process to correct most of the weaknesses identified. However, unless more is done, EPA may still not receive the quality of research it needs.

PB81-114407 PC **A03**/MF **A01**
General Accounting Office, Washington, DC. Procurement and Systems Acquisition Div.
Support Service Contracting at Johnson Space Center Needs Strengthening.
Report to the Administrator, National Aeronautics and Space Administration.
20 Oct 80, 29p PSAD-81-2

The National Aeronautics and Space Administration spends about $175 million annually on support service contracts at Johnson Space Center. GAO tested the way six of these contracts are administered and found a contractor was working without approved work orders, Government-furnished equipment was unaccounted for, questionable reimbursements occurred for contractor costs, contract funds increased before the need was justified, contracting officers were unaware of their responsibilities and unfamiliar with contract terms, and some contracting officers had a general attitude that small dollar value contracts are not worthy of adequate attention.

PB81-115198 PC **A03**/MF **A01**
General Accounting Office, Washington, DC. Financial and General Management Studies Div.
IRS Can Expand and Improve Computer Processing of Information Returns.
20 Oct 80, 33p FGMSD-81-4

The Internal Revenue Service has made considerable progress in matching tax returns with information returns (such as W-2s and 1099s) filed by employers and organizations that pay dividends, interest, and other taxable income. However, IRS has not yet achieved the full matching program intended by Congress. IRS has sufficient computer capacity for a full matching program, but it will need additional funding and personnel to transcribe information returns and to follow up on unreported income.

PB81-115404 PC **A02**/MF **A01**
Office of Management and Budget, Washington, DC. Budget Review Div.
Total Government Finances January 1980.
Jan 80, 10p
See also PB81-115396.

The attached tables are designed to provide two broad sets of information: the size and major components of total Government receipts, spending, and surpluses or deficits in the United States for each Federal fiscal year since 1947; and the size of Government receipts, expenditures, and surpluses or deficits relative to the total economy. (For this latter purpose, the fiscal year gross national product (GNP) was used as the measure of the size of the total economy.) These data on total government finances combine data on State and local government finances with Federal budget data. The Federal budget data are for the Federal unified budget plus off-budget Federal entities.

PB81-115453 PC **A06**/MF **A01**
Washington State Univ., Pullman. Small Business Development Center.
A Program of Management and Technical Assistance in the State of Washington.
Final rept. 1 May 79-30 Apr 80,
Gene Hansen. Nov 80, 120p EDA-80-0157
Grant EDA-07-06-01792-2

The Small Business Development Center, through its staff of Business Development Specialists, provides management and technical assistance to individuals and business firms throughout Washington. The purpose of the Center is to support economic growth in Washington by making the existing resources of Washington State University and other cooperating institutions accessible, and by delivering competent management and technical assistance in support of specific economic development projects. The Program of the Center is designed to increase employment opportunities and raise income levels in the State of Washington, particularly in the small business community.

PB81-115529 PC **A04**/MF **A01**
General Accounting Office, Washington, DC. Community and Economic Development Div.
Small Business Administration Franchise Loans: Risk of Loss Can Be Reduced and Program Effectiveness Improved.
11 Apr 80, 58p CED-80-47

The Small Business Administration accepts greater risks than necessary by not requiring franchisors (companies selling franchises) to guarantee repayment of loans or share SBA guarantees of bank loans as a condition of agency lending, accepting weak types of collateral, and guaranteeing most bank loans at the maximum percentage instead of negotiating for a lower percentage. Also, SBA needs to improve loan approval practices to make sure that legal requirements and Federal regulations are enforced and to better assist franchise borrowers.

PB81-118143 PC **A04**/MF **A01**
Public Technology, Inc., Washington, DC.
Municipal Fiscal Indicators; Urban Consortium Information Bulletin,
J. Richard Aronson. Aug 80, 67p HUD-0001690, HUD/PDR-580
Grant HUD-H-2886RG
Prepared in cooperation with Lehigh Univ., Bethlehem, PA.

The information bulletin examines the need to develop improved techniques for monitoring the overall fiscal conditions of local governments. Fiscal indicators such as community income levels, housing conditions, unemployment rates, and debt burdens are needed by government officials for effective city management and for design of tax and grant programs. Private individuals also need such information, since their economic well-being depends on the financial health of the cities in which they reside. Among the difficulties encountered in analyzing fiscal indicators are the quality of available data, the problems of comparing government units having different functions, and the difficulty of determining when a condition of fiscal stress is present. The bulletin discusses current efforts to develop fiscal indicators that address these problems.

PB81-118168 PC **A03**/MF **A01**
HUD USER, Germantown, MD.
Financial Management for State and Local Government.
Jul 80, 46p HUD-0001692, HUD/PDR-588
Contract HUD-H-2644

Most of the reports listed in this annotated bibliography were produced under HUD's Financial Management Capacity Sharing Program to help State and local governments improve their financial management practices. The forty-seven entries cite reports produced between 1973 and 1980. They are directed toward individuals who play key roles in the financial management process: elected and appointed chief executives, legislators, finance and budget officials, program planners, and persons who provide assistance to State and local governments. Topics include multiyear revenue and expenditure forecasting, financial planning, accounting, State roles in local financial management, and performance measures. Lists of personal and corporate authors are included. Availability information is given.

PB81-118192 PC **A07**/MF **A01**
Public Technology, Inc., Washington, DC.
Multi-Year Revenue and Expenditure Forecasting: Report of National Workshops.
1980, 137p HUD-0001712, HUD/PDR-602
Grant HUD-H-2999RG

In an attempt to increase the use of multiyear revenue and expenditure forecasting by the local government community, the Urban Consortium sponsored three workshops on the subject during the summer of 1979. The report highlights major findings in each of the following areas: the uses and benefits associated with forecasting revenues and expenditures, the relative advantages and disadvantages of alternative approaches, the costs and limitations of forecasting, and the transferability of forecasting systems, models and procedures. Also included are case study material on multiyear forecasting in Dallas, New Orleans, New York City, Portland, OR., San Antonio, and Washington, DC; fiscal impact analysis techniques; and suggestions for jurisdictions considering the development of their own multiyear revenue and expenditure forecasting systems. Appendices provide agenda, participant lists, and notebook outlines for each of the three workshops. Also appended are a directory of local government experts, a directory of related organizations, and a selected bibliography (about 30 items).

PB81-118523 Not available NTIS
National Bureau of Standards, Washington, DC.
Determining Cost Effectiveness of Automatic Typewriters.
Final rept.,
R. Savitsky. Feb 80, 4p
Pub. in Jnl. Syst. Manage. 31, n2 p28-31 Feb 80.

In order to justify the acquisition and continuing usage of automatic typewriters, definable criteria for determining their cost effectiveness can be developed and applied in an office. The criteria are based upon the relative costs and productivity of equipment to determine a breakeven level of utilization. The assumed benefit of automatic word processing equipment is in saved staff hours in the preparation of text. If the labor saved compensates for increased equipment costs, the automatic typewriter would be considered as cost effective. The analysis can be simplified by constructing graphs showing how intensively office equipment should be used so as to reach cost effectiveness.

PB81-119638 PC **A06**/MF **A01**
National Science Foundation, Washington, DC. Div. of Problem-Focused Research Applications.
Summary of Awards, Fiscal Year 1979, Division of Problem-Focused Research.
1979, 107p NSF/RA-800257, NSF-80-25
See also PB-299 423.

Awards presented in each of the following areas of the Division of Problem-Focused Research are described: alternative biological sources of materials; chemical threats to man and the environment; community water management; earthquake hazards mitigation; human nutrition; and science and technology to aid the physically handicapped. The presentation format includes the title of the specific grant, the name and mailing address of the principal investigator, the institution conducting the research, and a summary of the project. Persons wishing to obtain information on project findings--including project reports, monographs, journal articles, technical reports, and other relevant materials--should write to the principal investigator at the grantee institution to determine what information is available and at what cost, if any, it may be obtained.

PB81-119778 PC **A10**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Energy Lab.
Electric Generation Expansion Analysis System. A Progress Report on PRI 1529.
Jun 80, 217p MIT-EL-80-020
Prepared in cooperation with Stone and Webster Engineering Corp., Boston, MA., and Putnam, Hayes and Bartlett. Sponsored in part by Electric Power Research Inst., Palo Alto, CA.

The Electric Generation Expansion Analysis System (EGEAS) is planned to provide a state-of-the-art flexible software system for electric utility capacity expansion planning which will utilize a common data base and control program for both a set of core analysis alternatives and a set of modular, advanced feature packages. The system will be based upon selected existing operating and capacity expansion software as well as upon software developed during the length of the contract. EGEAS is based upon two currently available but independent optimization packages GEM, (linear programming) developed at MIT and OPTGEN (dynamic programming) developed by Stone and Webster Engineering Corp. In addition, EGEAS will utilize the operating system model SYSGEN developed at MIT. The complete EGEAS structure will incorporate a third optimization algorithm, Generalized Benders' decomposition, and two other analysis options, Year-End Optimization and Prespecified Expansion Pathway as portions of the overall system giving five analysis options. The data structure of the MIT GEM model will be expanded and evolved to be accessed by all five analysis options.

PB81-120073 PC **A07**/MF **A01**
Coates (J.F.), Inc., Washington, DC.
A Research Agenda on the Roles and Impacts of Appropriate Technology on Society, the Economy, and Technology Development. A Program Plan,
Joseph F. Coates, and Henry H. Hitchcock. 28 Aug 80, 138p NSF/RA-800248

An agenda is delineated for a five-year research plan for the National Science Foundation (NSF) dealing with the socio-economic and technological implications of appropriate technology (AT). Three broad considerations defining the plan are that it be research, not overlap functions of more mission-oriented agencies, and be compatible with traditional functions and objectives of NSF. A discussion of the conceptual background develops an alternative, broad definition of appropriate technology. Specific characteristics of the current technological system are compared with proposed AT systems. The research plan is presented in three parts dealing with (1) the social and economic implications of AT; (2) the role of AT in technological innovation; and (3) manpower and training issues of AT. Steps for best using the results of the proposed research are described. References and an extensive bibliography are included.

PB81-120362 PC **A03**/MF **A01**
National Bureau of Standards, Washington, DC.
Performance vs Design Standards.
Final rept.,
David Hemenway. Oct 80, 44p NBS-GCR-80-287

The report compares and contrasts performance and design standards from an economic perspective. The research consisted of a careful examination of the literature and interviews with interested NBS personnel. The paper describes the characteristics of performance standards, explains why they are not used more often, and discusses particular areas where they may be appropriate. The report examines the design versus performance issue in automobile regulation and health care. There are suggestions for further NBS action to promote performance standards, and a listing of areas for further research. Nine brief cases at the end of the paper illustrate points made in the main text.

PB81-122145 PC **A03**/MF **A01**
National Science Foundation, Washington, DC. Div. of Intergovernmental Science and Public Technology.
Summary of Awards, Appropriate Technology, Fiscal Year 1980.
1980, 31p NSF/RA-800258
See also report dated 1979, PB-299 423.

Appropriate technologies are defined as those which possess many of the following qualities: they are decentralized, require low capital investment, are amenable to management by their users, result in solutions that conserve natural resources, and are in harmony with the environment. They are also small or intermediate in scale, take into account site-available natural and human resources, and are more labor- than capital-intensive. Under the Appropriate Technology Program, support is given to research on urban innovation; small-scale industrial technology; recycling, resource recovery, and conservation; rural revitalization and the small farm; food and nutrition; and the roles and impacts of appropriate technology on society, the economy, and technological development. Awards for fiscal year 1980 are summarized. Data includes the project title, the principal investigator/project director, performing organization and address, amount of funding, and effective date. Appendices provide the NSF Program Plan for Appropriate Technology, the NSF Program Solicitation for Small Business Innovation Research, and NSF program announcements.

PB81-123184 PC **A03**/MF **A01**
McManis Associates, Inc., Washington, DC.
Revolving Loan Fund Technical Manual.
Sep 80, 45p EDA-80-0176
Grant EDA-99-10-00008

The purpose of this assessment was to provide insights into design and implementation issues encountered by grantees as they initiated their projects -- insights that could guide EDA's efforts to refine its guidelines and its administration of RLF grants. The manual describes the steps to be

taken in designing and implementing a revolving loan fund.

PB81-123234 PC **A04**/MF **A01**
McManis Associates, Inc., Washington, DC.
Assessment of EDA Funded Revolving Loan Fund Activities.
Sep 80, 59p EDA-80-0175
Grant EDA-99-10-00008

Revolving Loan Funds (RLF) were established to fill local credit gaps and to simplify the process of delivering financial assistance to local communities. They have expanded over the last five years from devices to reuse money granted to communities facing sudden and severe dislocation in their local economies to be components of long term economic development strategies in communities facing long term economic deterioration. The evaluation of the RLF program was initiated as part of EDA's effort to assess and, if necessary, improve the administration of the RLF program.

PB81-123747 PC **A07**/MF **A01**
Public Technology, Inc., Washington, DC.
Technical Information and Data Services for City and County Governments.
Research rept.,
C. Nelson Hoy. Mar 80, 131p NSF/RA-800267
Grant NSF-ISP78-12730

The report describes research committed to helping local governments improve services and cut costs through the practical use of applied science and technology. The research effort is based on a national perspective. It is pointed out that although city and county governments can access over 200 technical information and data services, local government officials are under increasing pressure to make better decisions. Design specifications for improving these services cover program goals, management strategies and policies, a user's base, and illustrative services and products. Descriptions and examples of the following services are given: a telephone hotline; an exchange newsletter; a customized research service; and a standard product service. It is suggested that these services can be implemented in various combinations. In a feasibility assessment, six criteria are considered as essential toward improving technology transfer at the local level: core application; top management support; service-practitioner support; local financial services; favorable costs and benefits; and technical information and data. Also offered are implementation options, conclusions, and recommendations.

PB81-125148 PC **A04**/MF **A01**
McManis Associates, Inc., Washington, DC.
Non-EDA Funded Revolving Loan Fund Reports.
Jan 80, 65p EDA-80-0177
Grant EDA-99-10-00008

Revolving Loan Funds (RLF) were established to fill local credit gaps and to simplify the process of delivering financial assistance to local communities. They have expanded over the last five years from devices to reuse money granted to communities facing sudden and severe dislocation in their local economies to be components of long term economic development strategies in communities facing long term economic deterioration. The following are non-EDA funded RLF site reports.

5B. Documentation and Information Technology

AD-A090 919/2 MF **A01**
Army Combined Arms Combat Developments Activity, Fort Leavenworth, KS.
Revised Document Control System User's Manual. Programmer's Manual.
Technical rept.,
Robert H. Kaeding, Jr. Sep 80, 95p Rept no. CACDA-TR-12-80
Supersedes report dated Dec 79, AD-A080 041.
Availability: Microfiche copies only.

The Document Control System (DCS) described in this report was developed to provide the Combined Arms Studies and Analysis Activity with an automated system for controlling, maintaining, and locating the various documents located within the Activity. The system was originally designed for the TEKTRONIX 4051, but the ever increasing number of documents soon became over-burdening resulting in excessive retrieval time. The present system represents a conversion to the CDC 6500 utilizing the existing data management system, System 2000. This report contains a general description of the system's structure and capabilities, a user's manual, a programmer's manual, and a glossary of keywords. (Author)

AD-A090 950/7 PC **A03**/MF **A01**
IIT Research Inst., Chicago, IL.
Tactical Weapon Guidance and Control Information Analysis Center.
Annual rept. no. 3, 1 Jul 79-30 Jun 80,
Charles W. Smoots. Aug 80, 37p GACIAC-AR-80-01
Contract DSA900-77-C-3840

This report summarizes the activities of the Tactical Weapon Guidance and Control Information and Analysis Center (GACIAC) during its third year of operation. The background and organization of the Center is reviewed and major activities consisting of internal operations, support services, and products and services are outlined. This report also serves as a contract status report covering the 12th quarter and as a final report on this three year program. (Author)

AD-A090 968/9 PC **A02**/MF **A01**
Virginia Univ., Charlottesville. Dept. of Chemistry.
A Microcomputerized Text Editor for Chemical Manuscripts,
J. N. Demas, and S. E. Demas. 1980, 4p
AFOSR-TR-80-0980
Grant AFOSR-78-3590
Pub. in Jnl. of Chemical Education, v57 n4. Bits and Pieces 1, p252 Apr 80.

No abstract available.

AD-A091 013/3 PC **A20**/MF **A01**
Training Analysis and Evaluation Group (Navy), Orlando, FL.
A Directory of Sources of Information and Data Bases on Education and Training.
Final rept. Sep 79-Sep 80,
M. Michael Zajkowski, Charles R. Guitard, and Clarence J. Papetti. Sep 80, 473p Rept no. TAEG-TN-6-80

This report is an integration of references to sources of information and data bases dealing with education and training in the military, academia, government, and commercial areas. It is a guide to the location, content, and means of access to these sources of information. (Author)

AD-A091 231/1 PC **A04**/MF **A01**
Office of Naval Research London, (England).
European Scientific Notes. Volume 34, Number 9,
Wayne V. Burt, and Don J. Peters. 30 Sep 80, 54p Rept no. ESN-34-9

This is a monthly publication presenting brief articles concerning recent developments in European Scientific Research. It is hoped that these articles (which do not constitute part of the scientific literature) may prove of value to American scientists by calling attention to current development and to institutions and individuals engaged in these scientific efforts. The articles are written primarily by members of the staff of ONRL anc occasionally articles are prepared by, or in cooperation with, members of the scientific staffs of the United States Air Force's European Office of Aerospace Research and Development and the United States ARmy Research and Standardization Group. Articles are also contributed by visiting Stateside scientists. (Author)

BARC-1024 PC **A06**/MF **A01**
Bhabha Atomic Research Centre, Bombay (India).
Research and Development Activities of the Neutron Physics Division for the Period January 1977-December 1978.
M. Ramanadham, and O. P. Joneja. 1979, 111p
U.S. Sales Only.

The research and development programmes of the Neutron Physics Division of the Bhabha Atomic Research Centre, Bombay, for the period 1977-1978 are outlined. The fields covered include reactor (neutron) physics, fusion and plasma neutronics, biological and high precision crystallography, solid state phenomena and seismology as well as the associated workshop facilities. (Atomindex citation 11:516009)

CEA-N-2093 PC **A05**/MF **A01**
CEA Centre d'Etudes Nucleaires de Grenoble (France). Dept. de Recherche Fondamentale.
Grenoble Fundamental Research Department. Semi-Annual Bulletin No. 14 1979, 1. Semester.
1979, 92p
In French.
U.S. Sales Only.

Studies on nuclear fission, defects created by irradiation in silver and iron, and, in the field of biology, ADN irradiation of E. Coli in aerated aqueous solution are reported. (Atomindex citation 11:523529)

ED-181 909 Not available NTIS
New Jersey Governor's Conference on Library and Information Services. Delegate Resolutions.
Apr 79, 15p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, Va 22210.

Written and adopted by delegates to the Governor's Conference in Spring 1979, this list of resolutions for libraries and library services in New Jersey covers seven topic areas: (1) general concerns, including the need for a Library and Information Services Planning Act: (2) broader access to public library services: (3) a statewide cooperative network, including the formation of a New Jersey Periodicals Center: (4) funding for public libraries: (5) library governance: (6) public relations: and (7) other concerns, such as the development of cable television in libraries, the need for regional film libraries, and the restructuring of library training to fit present community needs.

ED-181 915 Not available NTIS
North Carolina State Dept. of Public Instruction, Raleigh. Div. of Educational Media.
Advisory List of Instructional Media: Fiction. 1979-80 School Year.
1979, 52p
For related documents, See ED-149 746 and ED-175 408.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

This annotated bibliography from the Materials Review and Evaluation Services lists reviewed and evaluated fiction books for school media collections. Entries included on the list were selected from those materials submitted by publishers which received favorable reviews by educators. At the end of this bibliography may be found an unannotated list of books which have had favorable reviews in reliable reviewing sources. Books are listed by author, and each entry includes title, publisher, data of publication, cost, and grade level.

ED-181 916 Not available NTIS
North Carolina State Dept. of Public Instruction, Raleigh. Div. of Educational Media.
Advisory List of Instructional Media for Cultural Arts. 1979-80 School Year.
1979, 18p
For related document, see ED-167 176.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

Instructional media appropriate for school cultural arts programs are listed in this advisory list by type of media: activity cards, books, books (reference), films (16mm), filmstrips (sound), and recordings (disc). Entries in the list were selected from those materials submitted by publishers which received favorable reviews by educators. Each entry includes citation, price if available, grade level, and annotation.

ED-181 917 Not available NTIS
North Carolina State Dept. of Public Instruction, Raleigh. Div. of Educational Media.
Advisory List of Instructional Media for Languages.
1979, 30p
For related document, see ED-167 179.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

This advisory list contains instructional media appropriate to the language program in schools for primary through senior high school grade levels. Entries, selected from those materials submitted by publishers which received favorable reviews by educators, are arranged by type: activity cards, books, books (for teacher use), books (reference), books (supplementary texts), books (workbooks), books (workbooks) with recordings, dictionaries, films (16mm), filmstrips (sound), kits, recordings (cassette tapes), slide sets (sound), and tests. One workbook and one dictionary in Italian, and one supplementary text in Spanish and two Spanish dictionaries are also listed.

ED-181 918 Not available NTIS
North Carolina State Dept. of Public Instruction, Raleigh. Div. of Educational Media.
Advisory List of Instructional Media for Mathematics. 1979-80 School Year.
1979, 11p
For related document, see ED-175 411.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

This annotated bibliography from the Materials Review and Evaluation Services lists reviewed and evaluated instructional media appropriate for school media centers in the area of mathematics. Entries included on the list were selected from those materials submitted by publishers which received favorable reviews by educators. Materials are arranged by type of media: activity cards, books, books (for teacher use), books (reference), books (supplementary texts), books (workbooks), books (workbooks) with recordings, duplicating masters, films (16mm), filmstrips (silent), filmstrips (sound), games, kits, and tests. Each entry includes author, title, publisher or producer, date of publication, costs, and grade level.

ED-181 919 Not available NTIS
North Carolina State Dept. of Public Instruction, Raleigh. Div. of Educational Media.
Advisory List of Instructional Media for Reading. 1979-80 School Year.
1979, 25p
For related document, see ED-149 754.

This advisory list includes instructional media appropriate to the reading program in schools for primary through senior high school grade levels. Entries included on the list were selected from those materials submitted by publishers which received favorable reviews by educators. Materials are arranged by type of media: activity cards, books, books (for teacher use), books (supplementary texts), books with recordings, books (workbooks), books (workbooks) with recordings, films (16mm), filmstrips (sound), kits, recordings (cassette tapes), and tests. Entries include citation, price if available, grade level, and annotation.

ED-181 920 Not available NTIS
Bureau of School Systems, Washington, DC. Office of Libraries and Learning Resources.
Aids to Media Selection for Students and Teachers,
Beatrice T. Simmons, and Yvonne B. Carter. Sep 79, 105p
For related document, see ED-127 631.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210. Also available from Supt. of Docs.

Selected book lists and periodicals which review books, audiovisual materials, and multiethnic instructional materials are listed in this annotated bibliography which updates the 1976 edition. This edition includes four sections: book selection sources, periodicals, sources of audiovisual materials, and sources of multiethnic materials. A directory of publishers and an author-title index are included. Only reviewing tools published since 1976 are listed in this edition.

HMI-299 PC **A03**/MF **A01**
Hahn-Meitner-Inst. fuer Kernforschung Berlin G.m.b.H. (Germany, F.R.).
Programme Budget 1980. Planning Period 1979-1983.
Oct 79, 39p
In German.
U.S. Sales Only.

The fields of research done in the Hahn-Meitner institute are described. These concern heavy ion physics, radiation and photochemistry, solid state physics, radiochemistry, data processing and nuclear electronics. In addition some facts concerning the infrastructure and financial planning are presented. (Atomindex citation 11:514765)

IKE-K-57 PC **A07**/MF **A01**
Stuttgart Univ. (Germany, F.R.). Inst. fuer Kernenergetik und Energiesysteme.
Report on the Years 1977 and 1978.
K. H. Hoecker. Dec 79, 127p
In German.
U.S. Sales Only.

Reports on work in the following departments of the Institute of Nuclear Energetics and Energy Systemsare given; Department of reactor physics; Reports on work in the following departments of the Department of reactor safety and environment; Department of data processing and numerics; Department of energy conversion and heat engineering; Department of heating, ventilation, and air conditioning; Department of measured value acquisition and electronic control; Department of high-temperature technology. (Atomindex citation 11:514766)

LBL-10000 PC **A24**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Materials and Molecular Research Division Annual Report 1979.
Mar 80, 565p
Contract W-7405-ENG-48

Research is presented concerning materials sciences including metallurgy and ceramics, mechanical and physical properties, and engineering materials; solid state physics; materials chemistry; chemical sciences covering photochemical and radiation science, chemical and atomic physics; nuclear science; fossil energy; advanced isotope separation; and energy storage. (ERA citation 05:036892)

N81-10891/2 PC **A02**/MF **A01**
Ecole Nationale Superieure des Telecommunications, Paris (France). Dept. d'Informatique.
Data and Information Analysis Analyse de Donnees et Information.
C. Nora. Jun 79, 25p ENST-C-79022
Text in French. Presented at Afcet-Inforsid Sem., Pont-a-Mousson, France, 18-19 Jun. 1979.

Various processes employed to analyze and characterize multidimensional data are outlined. The principal underlying philosophy is exposed and the main methods used are given, including: classification of data (i.e., quantitative or qualitative); Charnoff; polygonal and Bertin's methods; classification and segmentation. Some concrete examples are treated involving classification and recognition problems.

PB81-111791 PC **A04**/MF **A01**
Internationale Dokumentationsgesellschaft fuer Chemie m.b.H., Frankfurt am Main (Germany, F.R.). Fachinformationszentrum Chemie.
Reorganisation der IDC-Patentdatenbank (Reorganization of the IDC-Patent-Data-File),
Klaus Kohlbecher, Gerhard Sittig, Max Wildgrube, and Johann-Christian Zechel. Jul 80, 71p BMFT-FB-ID-80-007
Also pub. as ISSN-0170-8996. Text in German, abstract in English.

The objective of the project was to further enhance methods for collecting bibliographical information in the IDC-Patent-Data-File (PDB) which had been developed and sponsored within work on Patent Documentation. Moreover, the objective was to facilitate handling these data and to open up new possibilities for application of PDB within documentation systems of IDC/FIZ CHEMIE. The project resulted in creating a software system which provides for the inclusion of input data especially those of Derwent Publication Ltd., INPADOC and Chemical Abstracts Service into the PDB using standardized data processing methods as far as possible. The system further permits the inclusion of hitherto unused information, such as patent classes, titles, state of the legal procedure etc. into the data file as well as permitting retrieval services and data corrections in dialog mode.

PB81-120388 PC **A02**/MF **A01**
National Science Foundation, Washington, DC. Div. of Problem Focused Research.
Recent Awards: January-March 1980.
Mar 80, 10p NSF/RA-800255, NSF-80-40
See also rept. for Apr-Jun 79, PB80-122187.

Each of the following program areas of the Division of Problem-Focused Research is described: alternative biological sources of materials; earthquake hazards mitigation; human nutrition; and science and technology to aid the handicapped. The presentation format includes the title of the specific grant, the name and mailing address of the principal investigator, the institution conducting the research, the award number, and a detailed summary of the project. Persons wishing to obtain information on project findings, including project reports, monographs, journal articles, technical reports, and other relevant materials, should write to the principal investigator at the grantee institution to determine what information is available and at what cost, if any, it may be obtained.

PB81-120396 PC **A02**/MF **A01**
National Science Foundation, Washington, DC. Div. of Problem Focused Research.
Recent Awards: April-June 1980.
Jun 80, 20p NSF/RA-800256, NSF-80-63

Each of the following program areas of the Division of Problem-Focused Research is described: alternative biological sources of materials; earthquake hazards mitigation; human nutrition; and science and technology to aid the handicapped. The presentation format includes the title of the specific grant, the name and mailing address of the principal investigator, the institution conducting the research, the award number, and a detailed summary of the project.

PB81-123531 PC **A07**/MF **A01**
Department of Education, Washington, DC.
Selected Bibliography of Egyptian Educational Materials: Volume 5, Number 3, 1979.
1980, 140p TT-79-59121/3
See also Volume 5, Number 2, PB80-226590. The above journal is translated on a regular basis. Sponsored in part by National Science Foundation, Washington, DC. Special Foreign Cuurrency Science Information Program.

A bibliography of educational materials in Egypt cites publications dealing with various phases of academic and technical training. Abstracts are presented of books and articles on organization, faculties, students, and teaching methods. Other topics are administration, testing, illiteracy, textbooks, social aspects, objectives, and higher education.

SGAE-3050 PC **A03**/MF **A01**
Oesterreichische Studiengesellschaft fuer Atomenergie G.m.b.H., Vienna.
INIS SDI Programs on the Siemens 4004/151-Computer.
A. Nevyjel. Jul 79, 49p MA-39/79, HB-13/79
In German.
U.S. Sales Only.

The programs for evaluation of INIS Atomindex were developed in 1973 for an IBM 360/30. In 1979 it was necessary to adapt the programs to the new SIEMENS 4004/151 computer. Execution procedure, monthly program sequence and file organization are described for the SIEMENS operating system BS2000. (Atomindex citation 11:514722)

UCRL-50058-80-2 PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Advances in Materials Science, Metals and Ceramics Division. Triannual Progress Report, February-May 1980.
J. J. Truhan, and K. M. Gordon. 1 Aug 80, 47p
Contract W-7405-ENG-48

Research is reported in the magnetic fusion energy and laser fusion energy programs, aluminium-air battery and vehicle research, geothermal research, nuclear waste management, basic energy science, and chemistry and materials science. (ERA citation 05:037436)

5C. Economics

AD-A091 161/0 PC **A03**/MF **A01**
Texas Univ. at Austin. Center for Cybernetic Studies.
The MDI Method as a Generalization of Logit, Probit and Hendry Analyses in Marketing.
Research rept.,
A. Charnes, W. W. Cooper, D. B. Learner, and F. Y. Phillips. Apr 80, 41p Rept no. CCS-368
Contract N00014-75-C-0569

Constrained minimum discrimination information methods provide a basis for a unified approach to a wide range of problems in marketing research. For instance, they lead to characterization parallel to those of the Hendry system and other entropic approaches, with greater economy of assumptions. Goodness-of-fit tests and a structure for decision modelling are supplied from the same basic models with a range of applications that include market segmentation and brand shifting choices. Other probabilistic models of marketing choice (logit, MCI, etc.) are also comprehend in ways that resolve many logical and computational difficulties in these other approaches. (Author)

AD-A091 287/3 PC **A05**/MF **A01**
RAND Corp., Santa Monica, CA.
Private Sources of Income of the Soviet Urban Household.
Interim rept.,
Gur Ofer, and Aaron Vinokur. Aug 80, 87p Rept no. RAND/R-2359-NA
Contract MDA903-76-C-0119

An analysis is made of the 'second economy' in the Soviet Union. The work is based on a survey of family budgets of about 1000 Jewish families who emigrated from the Soviet Union in the early 1970s. The families were asked basically to report on two things: (1) private sources and amounts of family income used to supplement family earnings from the public sector; (2) the amount of goods and services purchased from private sellers. The analysis treats the income side and the purchase side separately. For each, it presents the data for the sample population as is, and then adjusts estimates and projects findings to fit the target (urban) population and some of the macroeconomic national aggregates, such as GNP and total household income. (Author)

CRA-491 PC **A05**/MF **A01**
Charles River Associates, Inc., Boston, MA.
Meaning and Significance of Seller Concentration in the Coal Industry. Final Report.
Mar 80, 93p
Contract AC01-79EI10603

The principal conclusions and recommendations from the study by Charles River Associates of conceptual issues related to the measurement of seller concentration in the coal industry are summarized. In analyzing issues of market definition and concentration measures, we closely examined four recent government studies on concentration and competition in the coal industry. The level of seller concentration is a useful statistic for competitive analysis, but users should be aware of its limitations. The competitive assessment of an industry requires, in addition, that other elements of market structure and also market behavior be considered. Since coal usually trades in markets which are distinct from the markets for oil, gas, and nuclear fuel, properly defined coal markets constitute a meaningful entity for competitive analysis. Seprate markets exist at present for high-grade bituminous metallurgical coal and for steam coal. The boundary lines of these markets are becoming less distinct, however, as electric utilities seek more low-sulfur coal and some low-rank butuminous coal is used in the production of coke. The market for metallurgical coal can be distinguished according to high or low volatility of the coal. Spot coal and contract coal trade in a single market, since their prices are closely interrelated by arbitrage. Metallurgical coal has two geographic markets: (1) the West; and (2) the East and Midwest. Within the latter, North and Central Appalachia emerges as a distinct submarket. Steam coal has three geographic markets: Appalachia, the Midwest, and the West. Some studies have further divided the West into the Northern Plains and Southwestern markets. Factors influencing competitive relationships are frequently changing in relevance and relative importance. Consequently the boundaries of each coal market are dynamic. (ERA citation 05:034522)

DIB-80-12-500 PC**$10.00**/MF **A01**
International Trade Administration, Washington, DC.
Market Briefs for Ampro '81 July 1981 in Singapore.
Foreign market survey rept.
9 Oct 80, 95p
U.S. sales only for 8 months. Available to foreign addressees in Aug 81.

The market research was undertaken to study the present and potential US share of the market in Singapore; to examine growth trends over the next few years; to identify specific product categories that offer promising export potential for US companies; and to provide basic data which will assist US suppliers in determining current and potential sales and marketing opportunities.

DIB-80-12-501 PC**$10.00**/MF **A01**
Trancu (Theodore C.) and Associates, Milan (Italy).
Survey on the Italian Market for Machine Tools and Related Equipment.
Foreign market survey rept.
Oct 78, 213p
U.S. sales only for 8 months. Available to foreign addressees in Aug 81.

The market research was undertaken to study the present and potential US share of the market in Italy for machine tools and related equipment; to examine growth trends in Italian end-user industries over the next few years; to identify specific product categories that offer the most promising export potential for US companies; and to provide basic data which will assist US suppliers in determining current and potential sales and marketing opportunities. The trade promotional and marketing techniques which are likely to succeed in Italy were also reviewed.

PB80-928011 PC **E09**/MF **A01**
Central Intelligence Agency, Washington, DC.
Handbook of Economic Statistics, 1980; a Research Aid.
Nov 80, 243p ER-80-10452
Paper copy also available on Standing Order, Deposit Account required. North American Continent price based on page count of individual documents; all others write for quote. This series offers a reduction in price as a Standing Order, PB80-928000.

The Handbook of Economic Statistics, 1980, provides a compendium of statistics for selected non-Communist countries and all Communist countries. Most of the data are in tabular form, covering in general the years 1960, 1965, 1970, and 1973 through 1979. The subject matter covers a wide variety of topics, including economic growth, prices, foreign trade, foreign aid, transportation, and production of such items as energy, minerals, and agricultural products.

PB81-110009 PC **A04**/MF **A01**
Sterling Systems, Inc., McLean, VA.
Advanced New Community Simulation System: Economic-Financial Interface Model Analysis, Validation and Verification.
Final rept.,
David Cheng. Aug 80, 58p
Contract DHEW-H-4422

The Advanced New Community Simulation (NUCOMS) System is a computer-based set of models and data designed to provide a comprehensive economic and financial evaluation of a proposed new town or community plan. It contains the following major components: Regional Economic Model, Sector Model, Community Models (they include the Retail Demand Model, Industrial Demand Model, Office Space Demand Model and Residential Demand Model), Residential Scoring Model, Fiscal Impact Model, Financial Model, and the Economic-Financial Interface Model. The Economic-Financial Interface Model develops a relationship between household income and housing prices for the new community.

PB81-114464 PC **A04**/MF **A01**
Swedish Council for Building Research, Stockholm.
The Economics of Real Estate Management: Research Need in Sweden.
Paulsson Frenckner. 1980, 57p ISBN-91-540-3307-1, D27:1980

The report presents a catalogue of ideas concerning business economics research problems related to real estate management in Sweden. The emphasis is on overview of 'surveying' and 'guiding' research. A brief concluding section deals with method problems.

PB81-115594 PC **A13**/MF **A01**
Fraunhofer-Inst. fuer Systemtechnik und Innovationsforschung, Karlsruhe (Germany, F.R.).
Modell Chemische Technik Anwendung fuer die Bereiche Duengemittel, Waschmittel, Farben und Lacke. Anhang (Modell Chemische Technik, Applied to the Fields Fertilizers, Detergents and Coatings, Supplement),
Eberhard Boehm, Hermann Herz, Eberhard Jochem, Hans Kornprobst, and Harald Legler. Dec 78, 279p ISI-B-13-78-S, BMFT-FB-T-79-63
Also pub. as ISSN-0340-7608. Text in German, abstract in English.

For selected fields of the chemical industry (coatings, detergents, fertilizers, synthetic fibers and plastics) the expected demand for raw materials, the influence of raw materials availability on the production structure, the efficiency of new processes and new products on the raw materials situation, and the importance of chemical industry for West German economy are projected for the period 1976-2000. The mass flux from the raw materials to the end products is disintegrated and simulated by a numerical model. The process structure for the production of petrochemicals is evaluated by means of an optimization model which considers production costs, technological restrictions, prices of raw materials, available capital, etc. The supplement describes the chemical industry model and its submodels in detail.

PB81-115743 PC **A12**/MF **A01**
Fraunhofer-Inst. fuer Systemtechnik und Innovationsforschung, Karlsruhe (Germany, F.R.).
Modell Chemische Technik Anwendung fuer die Bereiche Duengemittel, Waschmittel, Farben und Lacke (Modell Chemische Technik, Applied to the Fields Fertilizers, Detergents and Coatings),
Eberhard Boehm, Hermann Herz, Eberhard Jochem, Hans Kornprobst, and Harald Legler. Dec 78, 265p ISI-B-13-78, BMFT-FB-T-79-62
Also pub. as ISSN-0340-7608. Text in German, abstract in English.

For selected fields of the chemical industry (coatings, detergents, fertilizers, synthetic fibers and plastics) the expected demand for raw materials, the influence of raw materials availability on the production structure, the efficiency of new processes and new products on the raw materials situation, and the importance of chemical industry for West German economy are projected for the period 1976-2000. The mass flux from the raw materials to the end products is disintegrated and simulated by a numerical model. The process structure for the production of petrochemicals is evaluated by means of an optimization model which considers production costs, technological restrictions, prices of raw materials, available capital, etc.

PB81-116089 PC **A10**/MF **A01**
Michigan Univ., Ann Arbor. Inst. of Science and Technology.
Economic Development Administration University Center, the University of Michigan, Final Report 1979-1980.
1980, 208p EDA-80-0159
Grant EDA-06-06-01538-01

Dual purposes of Michigan's Economic Development Administration University Center are to speed new technology to these economic base businesses, promoting their growth, and to provide effective management counseling, preventing their decline. University Center services are directed toward diversifying the economy in the state's southern counties through the development of countercyclical industries, and aiding distressed communities in the north through manufacturing job-creation efforts. University Center activity has contributed significantly to direct technical assistance efforts. The University Center functions as an economic facilitator, matching technical and management specialists with companies in need of their services.

PB81-116410 PC **A03**/MF **A01**
Andersen (Arthur) and Co., Washington, DC.
Analysis of Regulatory Cost on Establishment Size for the Small Business Administration.
Final rept.,
Michael E. Simon, and L. R. Beard. Oct 79, 38p
Contract SBA-2623-OA-79

The report summarizes and graphically displays a cost impact study of government regulations on the electrical machinery industry. The emphasis of the cost analysis is centered on the size of a business. Establishment size is expressed in terms of sales and number of employees separately.

PB81-117954 PC **A16**/MF **A01**
ACT Systems, Inc., Winter Park, FL.
Development and Application of a Water Supply Cost Analysis System. Volume II.
Final rept. Sep 78-79,
James I. Gillean, Rex D. Osborn, William L. Britton, Jr., and Robert M. Clark. Jul 80, 354p
EPA-600/2-80-012B
Contract EPA-68-03-2506

A cost analysis for system water supply utility management has been developed and implemented in Kenton County, Kentucky, Water District No. 1. This volume contains the program documentation for the cost analysis system.

PB81-118341 PC **A02**/MF **A01**
Johns Hopkins Univ., Laurel, MD. Applied Physics Lab.
A Program for Capital Recovery Assessment for the HP-97 and Other Desk Calculators,
Kwang Yu, and Roy von Briesen. 7 Aug 80, 17p
APL/JHU/QM-80-125
Report on Geothermal Energy Development in the Eastern United States.

A desk calculator program for estimating the capital recovery period for a geothermal space heating system has been developed for use with the Hewlett Packard 97 calculator. The program can also be adapted to the Texas Instrument 59 with the PC-100 printer. The program was developed to provide a simple economic model which could be used in various JHU/APL geothermal technical assistance projects.

PB81-118648 PC **A04**/MF **A01**
Virginia Univ., Charlottesville. Dept. of Economics.
Minimum Wages and the Distribution of Income.
Draft rept. (Final),
William R. Johnson, and Edgar K. Browning. 31 Oct 80, 64p
Sponsored in part by Minimum Wage Study Commission, Washington, DC.

The paper simulates the effect of changing the minimum wage on the distribution of income across households. The simulations account for several important factors which will affect the distributional impact of minimum wages.

PB81-118879 PC **A04**/MF **A01**
RTA, Inc., Kensington, MD.
Effects of Recent Gasoline Shortage on Retail Service Station Operations.
Final rept.,
Nolton Popeck, and Janis Miller. Dec 79, 61p
Sponsored in part by Small Business Administration, Washington, DC.

The report contains the results from a survey of retail gasoline operations in the Greater Washington Metropolitan Area. The purpose of the survey was to interview a selected group of gasoline dealers in an attempt to discover the effects of the recent gasoline shortage, and other influences, on retail service station operations.

PB81-119059 CP **T02**
Foreign Agricultural Service, Washington, DC. Data Systems Div.
Foreign Production, Supply and Distribution of Agricultural Commodities.
Data file,
Richard J. Cannon, Eldon C. Hildebrandt, and Nancy O. Palmerino. 1980, mag tape USDA/DF-81/001
Supersedes Rept. no. USDA/DF-80/001, PB80-177850.
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions.

The file contains foreign production, supply and distribution information. This includes area harvested, production, beginning stocks, total imports, total exports, total domestic use and ending stocks. Commodity coverage includes grains, rice, dairy, poultry, livestock, cotton, coffee, sugar, cocoa, potatoes, onions, garlic, tobacco and cigarettes. The most recent year reported is 1981. Complete supply and distribution data are not always available. When only production figures are reported, this will be indicated by a Production Only flag in the record.

PB81-119588 PC **A04**/MF **A01**
Social Systems, Inc., Chapel Hill, NC.
A Study of the Impact of Policy and Economic Variables on Small Businesses.
Final rept.,
Thomas Naylor. 10 Jun 80, 54p
Contract SBA-2637-OA-79

The objectives of the project were twofold. First, to develop a methodology for simulating the effects of national governmental policies and macroeconomic variables on the financial performance of small businesses. Second, to evaluate the feasibility of using this methodology with financial data taken from the Dun & Bradstreet Financial Statement File.

PB81-119703 PC **A02**/MF **A01**
Kansas Univ./Center for Research, Inc., Lawrence.
Evaluation of Strategies for Improving the Competitiveness of the Stainless Steel Flatware Industry in the World Market.
Annual rept. no. 2, 15 Sep 79-14 Sep 80,
B. G. Barr. Nov 80, 15p EDA-80-0161
Grant EDA-99-26-09898-10

The report is a summary of the activities and investigations undertaken during the twelve month period of the stainless steel flatware industry study. The University of Kansas Center for Research Inc. (CRINC) and the Economic Development Administration entered an agreement to develop and manage a program to assist the domestic Stainless Steel Flatware Industry in their efforts to successfully meet the challenge of an increasing level of imports.

PB81-119711 PC **A03**/MF **A01**
Economic Development and Industrial Corp. of Boston, MA.
Boston Naval Complex Re-Use Study.
Final rept.
May 79, 36p EDA-80-0162
Grant EDA-01-6-09722-26

The report contains a summary of the major studies and documents completed under this technical assistance grant. The work performed laid a firm foundation for the success of the Boston Marine Industrial Park. The report also describes the marketing efforts, the governmental coordination for planning and implementation, and the community participation in the planning process.

PB81-119893 PC **A07**/MF **A01**
Economics Research Associates, San Francisco, CA.
Five Cities Economic Dislocation Study. Revised Phase I Report: Identification and Documentation of Problems.
Nov 80, 137p EDA-80-0165
Grant EDA-07-09-02-069
See also Phase 2, PB81-119901.

The Riverside/San Bernardino/Ontario Standard Metropolitan Statistical Area (SMSA) economy has had some employment growth since 1970, but still maintains an unemployment rate which is significantly above the average for California and the Nation as a whole. Local needs for employment have only partially been met by the private sector CETA, or other programs. The rapid increase in immigrants has compounded the local economic problems caused by dislocations of Kaiser Steel and other firms. The author concludes that an economic action plan is needed in the Five Cities area to improve economic opportunity for existing and new residents during the 1980s.

PB81-119901 PC **A04**/MF **A01**
Economics Research Associates, San Francisco, CA.
Five Cities Economic Dislocation Study. Phase II: Recommended Implementation Program.
Nov 80, 54p EDA-80-0166
Grant EDA-07-09-02-069
See also Phase 1, PB81-119893.

The report discusses the unmet need for additional technical skill training; ERA's action plan recommendations; and the implementation procedures.

PB81-120099 PC **A05**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Dept. of Urban Studies and Planning.
Multiregional Methodologies for Railroad Analyses.
Rept. no. 23,
William H. Crown, and James R. Gallagher. Jun 80, 82p EDA-ERD-80-167
Grants EDA-OER-544-G-79-5, EDA-99-7-13351.4
Sponsored in part by Federal Railroad Administration, Washington, DC.

The purpose of the report is to describe the current state of the U.S. railroad industry and some of the regional methodologies that could be used to analyze it. Because the multiregional input-output technique permits an interindustry and interregional study of the railroad industry, this methodology was described in the greatest detail.

PB81-120370 PC **A04**/MF **A01**
Patch, Inc., Atlanta, GA.
Ole Cotton Mill Project, Economic Revitalization and Community Restoration, Gabbagetown, Georgia.
Final rept. 1 Jun 79-31 Oct 80.
Oct 80, 53p EDA-80-0163
Grant EDA-04-06-18006

The study project is designed to develop an implementation plan for the economic revitalization and community restoration of the Cabbagetown Historic District. Its main purpose is to explore the establishment of permanent economic benefits for residents by seeking financial and technical assistance for the expansion of existing enterprises on a business like basis, and for the development of a program which will induce businesses to locate in the area.

PB81-120420 PC **A06**/MF **A01**
State Univ. of New York Coll. at Plattsburgh. Economic Development and Technical Assistance Center.
Economic Development and Technical Assistance Program to Businesses and Communities of Northern New York.
Annual rept. 1 Oct 79-30 Sep 80.
Oct 80, 125p EDA-80-0164
Contract EDA-01-6-09408-13

See also report dated Jan 80, PB80-141328.

The Economic Development and Technical Assistance Center (EDTAC) is an action oriented organization providing answers on a consulting basis to problems which businessmen encounter. The Center provides assistance to businessmen in the areas of business stabilization, business expansion and new ventures and provides answers to government and civic organizations needing technical support and data. The overall program of EDTAC is comprehensive in scope and is ever-expanding to meet the special economic needs of northern New York.

PB81-120966 PC **A03**/MF **A01**
Economics and Statistics Service, Washington, DC.
Monitoring Foreign Ownership of U.S. Real Estate: A Report to the Congress (Summary).
Nov 80, 43p AGESS-801107.1

The technical and legal feasibility of four methods to obtain information on foreign ownership of U.S. real estate are analyzed and evaluated: (1) A centralized compulsory Federal registration system exclusively devoted to reports by foreign owners of U.S. real estate, (2) A compilation of data on foreign holdings of U.S. real estate from Federal offices already requiring reports on investment, income, or other related matters, (3) Foreign holdings data from a multipurpose land information system using information collected at the local level and serving a wide range of local, State, and national information needs, and (4) Foreign holdings data from nationwide periodic surveys of all landownership.

PB81-120982 MF **A01**
Department of Commerce, Washington, DC.
Business America - The Journal of International Trade, Volume 3, Number 23, November 17, 1980.
Bi-weekly pub.
17 Nov 80, 44p
See also Volume 3, Number 23, PB81-105132.
Paper copy available from Supt. of Docs.

Contents:
U.S. Exhibition opens in Beijing;
U.S. Embassy in Beijing analyzes Chinese economy;
Development banks chart new course;
Central America mission judged a success;
Economic highlights;
Business outlook abroad;
Worldwide business opportunities.

PB81-123937 PC **A06**/MF **A01**
Sterling Systems, Inc., McLean, VA.
Advanced New Community Simulation System: Retail Demand Model Analysis, Validation and Verification.
Final rept.,
David Cheng. Jul 80, 122p
Contract HUD-H-4422

The . Advanced New Community Simulation (NUCOMS) System is a computer-based set of models and data designed to provide a comprehensive economic and financial evaluation of a proposed new town or community plan. It contains the following major components: Regional Economic Model, Sector Model, Community Models (they include the Retail Demand Model, Industrial Demand Model, Office Space Demand Model and Residential Demand Model), Residential Scoring Model, Fiscal Impact Model, Financial Model, and the Economic-Financial Interface Model. The purpose of the Retail Demand Model is to provide a simple tool to analyze the types and magnitudes of incrementally new retail activity which can be supported by the new community within the context of the market area.

PB81-124893 PC **A17**/MF **A01**
Centaur Associates, Inc., Washington, DC.
Economic Development Administration Title I Public Works Program Evaluation. Evaluation Results and Methodology.
Sep 80, 397p EDA-80-0179
Contract EDA-T-36385

The general purpose of this study was to evaluate the impacts of the Title I Public Works Program of EDA. The specific objectives of the study were to: review and summarize the EDA's objectives and policies concerning the implementation of the Title I Public Works Program; determine the longitudinal benefits and costs of the Title I Public Works Program by assessing individual projects and aggregating the results in total and by type of project; Show the influence inflation has had on project and program impacts, and EDA's policies; Assess the time-phased relationship between program expenditure impact and local and national business activity cycles; and determine the applicability of the research methodology for evaluating impacts of Title I activities in larger urban areas.

PB81-923600 Subscription
Food and Drug Administration, Rockville, MD.
Monthly Import Detention List.
Monthly repts.
1980, 12 issues
Paper copy available on subscription, North American Continent price $50.00; all others write for quote. Single copies also available in paper or microfiche.

The Food and Drug Administration's Monthly Detention List tabulates currently detained imported items such as foodstuffs and pharmaceuticals. The detentions are arranged by product code; sample number; the product; district and port of entry; manufacturers and shippers name, city, and country of origin; the primary and secondary reason for detention; and unit type, quantity, and value.

5D. History, Law, and Political Science

AD-A090 874/9 PC **A08**/MF **A01**
Army Command and General Staff Coll., Fort Leavenworth, KS.
The Role of the People's Republic of China in the East Bengal Crisis of 1971.
Master's thesis,
Thomas C. Roberts, III. 1973, 154p AD-E750 026

This paper will examine China's decision to support Pakistan during the East Bengal crisis in 1971, in order to determine whether that decision constituted a contradiction in the light of Peking's previously professed support for revolutionary movements, or 'wars of national liberation'. Stated explicitly, the hypothesis which is to be explored is that China's support of Pakistan rather than of Bangla Desh is not contradictory when viewed in the context of the entire spectrum of foreign policies which Peking has pursued since 1949, and when the exigencies of the international situation faced by the PRC in 1971 are considered. (author)

AD-A090 958/0 PC **A03**/MF **A01**
Army War Coll. Strategic Studies Inst., Carlisle Barracks, PA.
Soviet Policy in Cuba and Chile.
Strategic issues research memo.,
Paul E. Sigmund. 6 May 80, 34p

This memorandum considers Soviet influence in Latin America in the 1960's and 1970's. In two countries, in particular, the tensions and contradictions of Soviet ideology and practice were demonstrated: Cuba and Chile. Both had relatively large and long-standing Communist parties. In both, Communist influence expanded suddenly and rapidly in ways which tested the Soviet Union's ability to respond both as a government and as a ideological center. At least from the vantage of the late 1970's those responses met with varying degrees of success which this memorandum attempts to evaluate. (Author)

AD-A090 959/8 PC **A11**/MF **A01**
Army War Coll. Strategic Studies Inst., Carlisle Barracks, PA.
The Soviet Union in the Third World: Successes and Failures.
Strategic issues research memo.,
Joseph L. Nogee. 20 Jun 80, 237p

This memorandum, based upon the contents of the papers presented at the 1979 Military Policy Symposium on the Soviet Union in the Third World, identifies those conclusions upon which there is a consensus and notes those where significant differences exist concerning the successes and failures of Soviet policy in the Third World. From his analysis of the papers the author concludes that in the long run the United States is in a better position than the Soviet Union to influence the outcome of events in the Third World. (Author)

AD-A090 960/6 PC **A03**/MF **A01**
Army War Coll. Strategic Studies Inst., Carlisle Barracks, PA.
Soviet Muslim Policy: Domestic and Foreign Policy Linkages.
Strategic issues research memo.,
Edward A. Corcoran. 30 Apr 80, 37p

This memorandum focuses on the linkages between the Islamic nations and the Soviet Muslims, and how those linkages affect the relations between the Soviet Muslims and their own government, and between the Soviet government and the total international environment. The author concludes that the net result of these various linkages with Soviet Muslims is that foreign policy considerations constrain the Soviet Union's options in solving its internal political problems; therefore, Soviet foreign policy, particularly toward the Muslim world, must be carefully coordinated with internal policies in Soviet Central Asia. (Author)

AD-A091 096/8 PC **A07**/MF **A01**
Naval Postgraduate School, Monterey, CA.
Political Culture and the Nature of Political Participation in Egypt.
Master's thesis,
David J. Anthony. Jun 80, 141p

This thesis analyzes Egyptian political culture and the directive effect which it has upon political development, elite recruitment and the nature of political participation. The pervasive nature of Islam and the centrality of kinship remain the basic factors in determining the nature of political participation in Egypt's non-institutional and personalist politics. The basic of Sadat's control, like that of his predecessor, rests with his continued support of the regime's conditional guardian, the military, and his ability to manage an intricate network of political clients. Despite the forces of modernization, political influence in Egypt rests with the traditional leadership of the rural elite and their urban family linkages. As such, a major threat to the regime's internal stability would not likely arise without the support of traditional rural elites, whose interests are strongly represented in the military. The masses are likely to resort to extra-legal activities only when fundamental values are threatened. (Author)

AD-A091 146/1 PC **A06**/MF **A01**
Naval Postgraduate School, Monterey, CA.
Soviet-Finnish Relations: Finlandization or Fraternization.
Master's thesis,
Paul Henry Nelson. Jun 80, 125p

This thesis examines Soviet-Finnish relations with the purpose of determining exactly what Finland's position is with respect to the Soviet Union and the degree to which the Finns have maintained their autonomy. An analysis of Finnish security with respect to Scandinavian NATO members as well as towards neutral Sweden and the Soviet Union is drawn, together with Finland's domestic situation, to portray a nation whose position is considerably different from what it is commonly perceived to be. Accordingly, the term Finlandization and what it actually means is determined. Finally, the potential of the Finnish approach to dealing with the Soviet Union is posed as a model for other small power to follow in dealing with a superpower.

AD-A091 316/0 PC **A03**/MF **A01**
Center for Naval Analyses, Alexandria, VA. Inst. of Naval Studies.
An Indicator of Informal Empire: Patterns of U.S. Navy Cruising on Overseas Stations, 1869-1897.
Professional paper,
Stephen S. Roberts. Sep 80, 47p Rept no. CNA-PP-295

Several historians, notably Gallagher and Robinson in England and William Appleman Williams in

the U.S., have expressed the theory that nineteenth century imperialism included not only the well-known formal empires but also what Gallagher and Robinson call 'informal empire' over much of the rest of the world. They add that the latter was the preferred means of control, and that formal empire was resorted to only if informal methods failed. These years were also the heyday of overseas cruising by the U.S. and major European navies. These navies put a large proportion of their resources into maintaining 'station fleets' of cruisers and gunboats in nearly all parts of the world, often at the expense of the battle fleets at home. It seems that, if the concept of informal empire is valid, the activities of the station fleets must necessarily have been consistent with it, since these fleets were the primary representatives of U.S. and European military strength overseas and therefore would have been the primary type of 'police force' for whatever form of empire (or control, or influence) was in force.

5E. Human Factors Engineering

AD-A090 853/3 PC **A10**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH.
Maximum Grasping Reach of Operators Possessing Functional Impairments of the Upper Extremities.
Master's thesis,
Lucky Arlan Goebel. Dec 78, 220p Rept no. AFIT-CI-79-181T

This study documents the difference between the maximum grasping reach of non-disabled people and disabled people who have functional impairments of the upper extremities. A methodology for measuring and analyzing the grasping reach distance within eight vertical and thirteen horizontal planes is presented. Graphs are used to illustrate the differences between the fifth percentile data of both groups. Statistically significant differences were obtained between the non-disabled and disabled groups at the 5% level. Each disabled subject was categorized into one of four subgroups according to the extent his disability impaired performance of the assigned grasping reach task. The non-disabled group was compared to the subgroups to observe the extent to which the degree of impairment affected the reach capability of each group. (Author)

AD-A091 191/7 PC **A03**/MF **A01**
Man Factors, Inc., San Diego, CA.
Human Engineering Design Criteria for Modern Control/Display Components and Standard Parts.
Final rept. 16 May 79-16 May 80,
W. E. Woodson, and C. Coburn. May 80, 43p MFI-80-101(R), DRSMI/RS-CR-80-2, AD-E950 044
Contract DAAK40-79-C-0145

Review and analysis of control-display requirements in MIL-STD-1472B for the purpose of updating to reflect contemporary hardware component use in military system, equipment and component products. In addition to detailed modifications, general recommendations are made for future Standard revision. (Author)

PB81-122921 PC **A10**/MF **A01**
Swedish Council for Building Research, Stockholm.
Proceedings on Colloquium on the Working Environment in the Construction Industry Held at Stockholm, Sweden on March 27-29, 1979.
1980, 222p ISBN-91-540-3247-4, D17:1980

The report provides the proceedings of a Colloquium on the working environment in the Construction industry held by the Swedish Council for Building Research at Stockholm in March 1979. The three themes discussed are the physical factors, chemical factors, and psycho-social perspective.

5F. Humanities

AD-A090 920/0 MF **A01**
State Univ of New York At Binghamton Dept of Anthropology
Batavia Reservoir Compound. Phase I Archaeological Summary.
Final rept.,
J. Terrence McCabe, A. Peter Mair, Karen Davis, Bob McGregor, and Mike Bailey. Oct 80, 176p
Contract DACW49-79-C-0072
Availability: Microfiche copies only.

During the course of a Phase I archaeological reconnaissance of the Batavia Reservoir Compound area, twenty-three new archaeological sites were recorded. Of these, seventeen were prehistoric sites and six were historic foundations. Intensive Phase II investigation will be required for nine of the prehistoric sites. Less intensive Phase II investigation will be required for six of the prehistoric sites. All six historic sites will require limited subsurface testing, measurement, precise mapping and deed searches. Of the entire project area, 39% was intensively sampled by either systematic surface survey or shovel testing; 31% was walked over; 30% was either open water or swamp.

AD-A091 018/2 PC **A05**/MF **A01**
Air Force Academy CO Dept of English
Cleanth Brooks at the United States Air Force Academy April 11-12, 1978,
James A. Grimshaw, Jr. 1980, 92p

Mr. Cleanth Brooks's visit to the United States Air Force Academy marks a milestone in the Department of English's history: he is the first critic of literature to participate in the Cadet Forum on Public Affairs' Distinguished Speakers Program, a program designed to present to cadets views and opinions of leading figures from divers disciplines. Not mentioned in his formal acceptance of 15 November 1977 (p. vii) was his kind acceptance of our proposal to talk informally in individual classes prior to his formal address to the Cadet Wing. Consequently, English Department members arranged complete coverage of his two-day visit. This volume records that visit and Mr. Brook's remarks. A brief index provides references to titles and key subjects covered in these remarks.

5G. Linguistics

AD-A091 302/0 PC **A16**/MF **A01**
MRM Inc Hyattsville MD
Somali Syntax,
A. K. Zholkovskiy. 1979, 352p
Contract MDA904-79-C-0479
Trans. from Academy of Sciences of the USSR, 1971, by Emery W. Tetrault.

No abstract available.

PB81-800351 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Psycholinguistics. 1964-November, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-Nov 80,
Mary E. Young. Nov 80, 104p
Supersedes PB80-800501, and NTIS/PS-78/1129.

The citations include references to research on psycholinguistics and related topics, such as syntax, semantics, phonetics, word association, and the psychology of learning languages. (This updated bibliography contains 87 citations, 3 of which are new entries to the previous edition.)

5H. Man-Machine Relations

N81-10703/9 PC **A03**/MF **A01**
European Space Agency, Paris (France).
A Study on Pilot/Observer Interaction in Aligning a Helicopter with a Target.
E. Danneberg. Jan 80, 32p ESA-TT-480, DFVLR-FB-79-04
Transl. Into English of "Untersuchung des Zusammenwirkens von Pilot und Beobachter Beim Ausrichten des Hubschraubers Auf Ein Ziel", Rept. Dfvlr-FB-79-04, Dfvlr, Brunswick, Nov. 1978. Original Report in German Previously Announced as N79-30945.

Speed and stability of the alignment of a helicopter with a target are investigated by means of a system simulation. Variables are the maximum yaw rate of the helicopter, the maximum pan rate of the steerable sight or sensor, and their optical magnification. The results obtained provided favorable combinations of these parameters for two different cases, i.e., target acquisition and target already picked up by means of the sight or sensor, respectively.

5I. Personnel Selection, Training, and Evaluation

AD-A090 875/6 PC **A09**/MF **A01**
Army Command and General Staff Coll., Fort Leavenworth, KS.
Induced Stress, Artificial Environment, Simulated Tactical Operations Center Model.
Master's thesis,
Don E. Gordon. Jun 73, 179p AD-E750 025

This study investigates the feasibility of designing, constructing, and operating a conceptual model of a tactical operations center simulator. The model is intended to simulate performance tasks identified for Army Security Agency company level officers during combat operations. The model has been operational at the United States Army Security Agency Training Center and School, Fort Devens, Massachusetts, since 1970 and continues to serve as an alternative to other more costly methods of combat simulation. The model's subsystems include an electro-optic simulation of tactical level communications and electronic warfare techniques. High resolution aerial photography is simulated by closed circuit television suspended above a terrain board. Stress is induced by information overload, accelerated and compounded decision making, peer group pressure, and battle drills. An artificial environment is effected by performance testing and role playing in conjunction with an HO scale (1/4 in.:1 ft.) model war game exercise. The model may be used with computer assisted performance testing. The study describes the use of the model as an instructional device, performance testing device, and as a substitute for a brigade level command post exercise. Application of the model to civilian education and other training agencies is discussed. Technical data reporting on the method employed to simulate radio wave propagation by visible light waves are provided in detail. (Author)

AD-A090 924/2 PC **A02**/MF **A01**
Military Academy, West Point, NY. Office of the Director of Institutional Research.
The First Class Questionnaire, Class of 1980,
John W. Houston. Aug 80, 23p Rept no. 80-012

The First Class Questionnaire is given annually to each First Class prior to graduation to get an assessment of the four-year program and to develop trends in cadet attitudes. This report lists the responses of the Class of 1980 to the First Class Questionnaire, administered by the Office of the Director of Institutional Research during the period 14-25 April 1980. Usable replies were received from 433 cadets. Similar First Class Questionnaires have been administrated in previous years. Questionnaires from 1957 to the present were reviewed. Whenever the same questions appeared in these previous questionnaires, the summary of the responses was included for comparison purposes. (Author)

AD-A090 974/7 PC **A05**/MF **A01**
Denver Research Inst., CO.

Microterminal/Microfiche System for Computer-Based Instruction: Hardware and Software Development.
Interim rept. Jul 78-Jan 80,
James P. Kottenstette, Dale A. Steffen, and Joseph P. Lamos. Oct 80, 79p AFHRL-TR-80-17 Contract F33615-78-C-0046

The development of the Air Force Human Resources Laboratory Microterminal/Microfiche System is an effort to combine microprocessor technology with microfiche medium to provide a low cost system for the delivery of technical training with a capability to function in the broader scope of computer-based instructional environments, including both computer-managed instruction and computer-assisted instruction. The system is composed of four major components and associated interfaces. The major components are (a) microterminal, (b) microfiche reader, (c) memory module, and (d) hardware interface between the microterminal and the microfiche reader. The microterminal is the result of a previous effort and was developed to support standalone, off-line testing. The microfiche reader is an off-the-shelf unit and is adapted to allow sensing of the position of the platen containing the microfiche so that frame locations can be verified by the microterminal software. The memory module is portable and removable from the microterminal which provides an interface to a larger computer-based instruction system. The microterminal can support various levels of testing and has already been successfully demonstrated in a technical training environment. The interface between microterminal and microfiche consists of linear position transducers on the microfiche unit and control circuitry in the microterminal to provide platen position sensing and additional circuitry to allow software control of the projection lamp. A demonstration of the microterminal/microfiche system has been successfully performed supporting testing functions in technical training.

AD-A090 983/8 PC **A02**/MF **A01**
Foreign Technology Div., Wright-Patterson AFB, OH.
An Analysis of the Communist Revampment of the Conscription System,
Kan T'ang. 14 Nov 79, 22p Rept no. FTD-ID(RS)T-1592-79
Edited trans. of Chinese Communist Affairs Monthly (China) v20 n11 p61-70, 5 May 78.

No abstract available.

AD-A091 009/1 PC **A11**/MF **A01**
Naval Education and Training Program Development Center Pensacola FL
Introduction to Sonar, Revision.
1976, 232p Rept no. NAVEDTRA-10130-C-REV

This Rate Training Manual and Nonresident Career Course (RTM/NRCC) form a self-study package for those personnel who are seeking advancement in the Sonar Technician Rating. This package will enable these personnel to help themselves fulfill the requirements of the rating. Among these requirements are the ability to obtain and interpret underwater data for operational use; operate and maintain upkeep of sonar equipment; perform as a member of an antisubmarine (A/S) attack team; interpret target and oceanographic data; perform intermediate maintenance on sonar and allied equipment; and to work with records and reports associated with sonar operations. Designed for individual study and not formal classroom instruction, the RTM provides subject matter that relates directly to the occupational qualifications of the Sonar Technician Rating. The NRCC provides the usual way of satisfying the requirements for completing the RTM. The set of assignments in the NRCC includes learning objectives and supporting items designed to lead students through the RTM.

AD-A091 077/8 MF **A01**
Army Project Manager for Training Devices Orlando FL
Squad Weapons Analytical Trainer (SWAT) M-16 Version.
Final rept.,
Albert Marshall, Bon Shaw, Herbert Towle, George Siragusa, and Tom Riordan. Jul 80, 152p Rept no. PM TRADE-RE-0005
Availability: Microfiche copies only.

The Squad Weapons Analytical Trainer (SWAT) is an electro-optic based, microcomputer controlled, training device that enables tactical infantry weapons training with a M-16 rifle, under a simulated high stress battle field environment. (Author)

AD-A091 079/4 PC **A07**/MF **A01**
Naval Postgraduate School, Monterey, CA.
Surface Warfare Officer Career Development; An Analysis of Historical Data.
Master's thesis,
William Harrison Campbell. Jun 80, 144p

Officer Master File data were used to reconstruct and analyze the career paths of a sample of 1,084 year group 1958-1963 Surface Warfare Officers. Of particular concern were the developmental characteristics, apart from performance, which distinguished the careers of commander-command selectees from those of nonselectees. A wide variety of career development opportunities were found to have been provided to Surface Warfare Officers to enable them to quality for command selection, and the absence of any absolute path to selection or nonselection was confirmed. There were, however, certain individual billet types, combinations of billets and commissioning sources which, if experienced by Surface Warfare Officers, tended to increase or decrease their probability of later command selection. In this regard, the singular importance of the lieutenant commander executive officer tour to command selection was documented. (Author)

AD-A091 093/5 PC **A02**/MF **A01**
Naval Postgraduate School, Monterey, CA.
Analysis of Manning Decisions and Concepts Utilized for the FFG-7 Class Ship.
Master's thesis,
Richard Ray Arnold, and Robert William Barrie. Jun 80, 15p

The FFG-7 Class ship acquisition program began in 1970 and is scheduled to include more than 50 hulls, or about 20 percent of the Navy's surface ships, upon completion of the project in 1988. This thesis reviews the chronology of the FFG-7 Class and analyzes some of the major historical events in its development in an attempt to discover the reasons for increased manning and accommodation requirements. Analysis showed weaknesses in the manpower requirements determination process and in the coordination of ship acquisition managers with manpower planners and fleet units. Recommendations are presented to improve the ship manpower documentation (SMD) program and coordination of manpower planning, operational, and project design functions in the surface ship acquisition process. (Author)

AD-A091 094/3 PC **A12**/MF **A01**
Naval Postgraduate School, Monterey, CA.
A Plan for the Evaluation of Leadership Training in the United States Army.
Master's thesis,
John Evan Davies. Jun 80, 254p

The Army, in a period of constrained resources and increasing demands on its leaders, can ill afford to pursue leadership training which is ineffective. The evaluation plan developed in this study seeks to provide the decision maker with information necessary to guide the training development towards its desireed outcome: producing better leaders. A review of the leadership theories contributing to the Army's organizational leadership model, their training programs, and the leadership training of the other services is presented. Their methods of program evaluation are stuided. The evaluation plan is a systematic study employing five principal criteria; process evaluation, learning, attitudinal change, behavioral change, and the change in organizational performance. Each is discussed in terms of its source of data, experimental design, and contribution to the overall understanding of the training program's effectiveness. The evaluation scheme is presented in an action plan format to coincide with other ongoing initiatives in the leadership and educational fields. (Author)

AD-A091 105/7 PC **A07**/MF **A01**
Air Force Human Resources Lab., Brooks AFB, TX.
Computerized Algorithms: Evaluation of Capability to Predict Graduation from Air Force Training.
Final rept.,
Walter G. Albert. Sep 80, 135p Rept no. AFHRL-TR-80-6

This report contains the results of a study to compare the classification accuracy and computer resource requirements of the Motivational Attrition Prediction (MAP) computerized algorithm with the classification accuracy and computer resource requirements of other computerized statistical algorithms capable of predicting graduation from Technical Training, Basic Military Training, and Undergraduate Pilot Training. It includes descriptions of the sampled populations, sample selection from each population, independent and dependent variables, comparison of classification accuracies and required computer resources, and related research efforts. (Author)

AD-A091 113/1 PC **A03**/MF **A01**
Naval Aerospace Medical Research Lab., Pensacola, FL.
A Comparison of College Background, Pipeline Assignment, and Performance in Aviation Training for Black Student Naval Flight Officers and White Student Naval Flight Officers.
Final rept.,
Annette G. Baisden. Jul 80, 36p Rept no. NAMRL-SR-80-2

This is the fourth and final report in a series of reports analyzing minority officer accessions and attritions in the Naval Air Training Program. Previous reports compared black civilian procured applicants and white civilian procured applicants in terms of aviation selection test performance. In addition, black students in pilot training were compared with a matched sample of white students on training performance variables and college background factors. This report examines for differences in selection test scores, training grades, complete/attrite data, and college background factors between black students and a matched sample of white students in naval flight officer training. This report shows that black student naval flight officers (SNFO) performed significantly poorer on most training variables than a matched sample of white student naval flight officers. The overall attrition rate for the total group of black SNFOs was significantly higher than the overall attrition rate for the total group of matched white SNFOs. The category of attrition entitled 'Drop on Request' was the predominant category of attrition for both the black student naval flight officers and the white student naval flight officers. Significantly more black students than white students attrited for academic reasons, while significantly more white students than black attrited for reasons of physical disqualification and not aeronautically adapted. Statistically significant differences between pipeline assignments of the black SNFOs and pipeline assignments of the white SNFOs were found.

AD-A091 117/2 Not available NTIS
Navy Occupational Development and Analysis Center Washington DC
Comprehensive Occupational Data Analysis Programs (CODAP).
Software,
J. P. Miller, Robert Groover, 1980, Mag tape DOD/DF-81/001
Supersedes Rept. no. DoD/DF-77/003, AD-A039 306.
Availability: Source tape is in EBCDIC character set. Tape(s) can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Idntify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions. Mag Tape $360.00. Price includes documentation available only in draft form.

CODAP is a series of computer programs for occupational analysis which: permit the transformation of job data into machine input form; allow certain mathematical and summary processes to occur; and present reports relative to job organization and statistical information related to defined job areas. The Export version of CODAP is contained on one reel of magnetic tape. It produces a single sheet of installation instructions and a punched

deck containing these instructions. The tape contains detailed instructions and user job stream for installation, plus certain modules, CODAP execution procedures, and selected utility procedures.

AD-A091 145/3 PC **A05**/MF **A01**
Naval Postgraduate School, Monterey, CA.
Success of Job Corps Personnel Entering the Military.
Master's thesis,
Guy Joseph Carrier. Jun 80, 87p

This thesis studied the performance in the military of non-prior service males entering the military after they were members of the Department of Labor's Job Corps program. Data analyzed included age, educational level, race and success in the military. Multivariate analysis was conducted and regression and Automatic Interaction Detection models developed to predict military entrance and success rates of Job Corps trained individuals. Policy implications and recommendations for the recruitment of Job Corps personnel are presented. (Author)

AD-A091 192/5 PC **A06**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH.
Computer-Supplemented Structural Drill Practice versus Computer-Supplemented Semantic Drill Practice by Beginning College German Students: A Comparative Experiment.
Doctoral thesis,
Reiner Horst Schaeffer. 1979, 124p Rept no. AFIT-CI-79-220D

This study investigated the effectiveness of two types of computer practice, structural and semantic, across two levels of verbal aptitude. The experiment was conducted at the United States Air Force Academy. Subjects (n = 72) were beginning college German students who had no previous high school language training. The cadets were randomly assigned to three groups: (1) Structural Practice, (2) Semantic Practice, and (3) No Practice (Control). Groups 1 and 2 practiced the same grammatical concept on the computer with structural and semantic exercises, respectively. A structural exercise could be accomplished based on knowledge of structure alone, while a semantic exercise's successful accomplishment depended upon understanding of the meaning of the item/problem; structure was a secondary consideration. The control group had no practice. The results of the study support the importance of meaningful (semantic) practice in the second-language learning process. Interpersonal interactions are not an explanation for the advantage observed for meaningful language practice in other experiments.

AD-A091 193/3 PC **A07**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH.
The Effects of a Contextual Visual on Recall Measures of Listening Comprehension in Beginning College German.
Doctoral thesis,
Gunther A. Mueller. May 79, 132p Rept no. AFIT-CI-79-221D

Two experiments were conducted to test the effects of visual support for listening comprehension with beginning German students at the United States Air Force Academy. It was hypothesized that a contextual visual would facilitate listening comprehension on the basis of its ability to activate and bring to bear on the listening process relevant elements of stored memory. Subjects in Experiment I (N=123) had studied little or no German in high school, while those in Experiment II (N=76) had studied between four and six semesters of high school German. With respect to the visual versus no-visual experimental conditions, statistically significant differences at or beyond the 0.05 level were found between the groups in Experiment I (less proficient students), but no significant differences were found between the groups in Experiment II (more proficient students). The results of this study suggest that the effects of a contextual visual are inversely related to the listener's level of proficiency and that visual support does not in and of itself facilitate listening comprehension.

AD-A091 205/5 PC **A11**/MF **A01**
Army War Coll., Carlisle Barracks, PA.
The Volunteer Soldier--A Self-Portrait.
Study project rept.,
James H. Powers. 27 May 80, 233p

This is a mosaic of the volunteer, first-term soldier: the circumstances surrounding his decision to enlist, his impression of the service, and factors surrounding his reenlistment decision. It is in his words, comprised of sixty-four interviews with first-term soldiers from Berlin Brigade, V and VII Corps, Carlisle Barracks, and Forts Myer, Eustis, Belvoir, Meade, Campbell, and Knox. During the conduct of these interviews, balance was sought between those reenlisting and not reenlisting, male and female, minority and non-minority, combat and other MOS's, and geographic area of assignment. Despite that effort, some MOS's are duplicated; however, the interviews encompass forty-eight unique job titles. The book is intended as professional reading for Army leaders and as an historical document. (Author)

AD-A091 211/3 PC **A04**/MF **A01**
Training Analysis and Evaluation Group (Navy), Orlando, FL.
Application of Random Access Video Programs in Navy Electronic Warfare Training,
Willard B. Stubbs, and Ted E. Pearson. Sep 80, 72p Rept no. TAEG-91

This report presents the results of one aspect of the development of the Navy Consolidated Electronic Warfare (EW) Operator Training Program. It focuses on the efforts of the Training Analysis and Evaluation Group in developing interactive instructional television training programs for EW signal recognition training. (Author)

AD-A091 217/0 PC **A09**/MF **A01**
Air Force Occupational Measurement Center, Randolph AFB, TX.
Medical Administrative Career Ladder, AFSC 906XO.
Occupational survey rept.,
Michael D. Hill. Jul 80, 188p

Inventory booklets were administered to Medical Administrative incumbents during the fall of 1979. Responses were received from 2,444 Medical Administrative incumbents (75 percent of the total assigned population). The overall sample was representative and provided a comprehensive picture of the 906XO population. The overall job structure was found to be extremely diverse, with 16 major job groups being identified. These jobs varied greatly. They ranged from routine jobs, such as forms and publications clerk, mail clerk, outpatient records clerk, and information or appointment clerk; to medical squadron section personnel; to more difficult jobs, such as resource management/medical service account personnel, biometric clerk, and health advisor. These 16 major groups broke out into four general job groupings: administration, resource management, patient affairs, and supervision. The jobs performed by 3, 5-, and 7-skill level personnel were primarily technical in nature. Even at the 9-skill level, personnel devoted a third of their time to nonsupervisory functions. Similar trends were noted in the TAFMS analysis. Both the AFR 39-1 Specialty Descriptions and the STS adequately described the range or job functions performed by 906XO personnel. No modifications were suggested.

AD-A091 228/7 PC **A05**/MF **A01**
CONSAD Research Corp., Pittsburgh, PA.
Capacity of Air Force Operational Units to Conduct-the-Job Training: Development of Estimation Methodology.
Final rept.,
Fred H. Rueter, Thomas R. Bell, and Edward V. Malloy. Oct 80, 82p AFHRL-TR-80-46
Contract F33615-78-C-0058

This technical report documents the development and initial empirical testing of a practical methodology for estimating the capacity of Air Force operational units to conduct on-the-job training (OJT). The methodology is based on a conceptual model of OJT capacity that describes the complex interrelationships among the level and quality of mission performance achieved, and the amount and quality of training provided, by an operational unit. The unit's capacity to conduct OJT is then determined as the maximum amount of training sustainable by the unit without compromising established training quality and mission performance standards. The model has been empirically tested by estimating its basic structural equations, to the extent possible, using existing data for six operational units. Despite substantial limitations in data availability, the empirical analyses reveal, for all units studied, a persistent and strong inverse relationship between the training load of a unit and the mission performance quality of the unit. These favorable results indicate that further development of the OJT capacity estimation methodology can reasonably be expected to significantly enhance Air Force training management capabilities.

AD-A091 229/5 PC **A03**/MF **A01**
Dayton Univ., OH. Research Inst.
Pop-Up Weapon-Delivery Maneuver: Use of Pilot Self-Assessment Data in Analysis of Critical Components.
Final rept.,
Don R. Lyon, James L. Eubanks, Thomas H. Killion, Robert T. Nullmeyer, and Edward E. Eddowes. Oct 80, 29p AFHRL-TR-80-33
Contract F33615-77-C-0054

Performance of the pop-up weapon-delivery maneuver by F-4 pilots and Weapons Systems Officers was analyzed by collecting detailed ratings and reported errors on segments of the maneuver. The major result of this analysis was that rated performance on the final few seconds of the maneuver, during which the crew is trying to execute a constant angle, high-speed dive, is clearly the best predictor of weapons delivery accuracy. Training implications and issues related to the use of self-assessment data are briefly discussed. (Author)

AD-A091 236/0 PC **A06**/MF **A01**
Navy Personnel Research and Development Center, San Diego, CA.
Guidelines for Cost-Effectiveness Analysis for Navy Training and Education.
Special rept.,
Philip L. Doughty, Hervey W. Stern, and Cindy Thompson. Jul 76, 116p Rept no. NPRDC-SR-76TQ-12

Cost-effectiveness analysis as applied in a military training context is intended to provide systematic information that can be used to select alternative strategies, methodologies, or settings in achieving training objectives. This form of systems analysis is designed to aid the decision maker in selecting from training alternatives by providing a concise and clear-cut review of relevant variables that bear on the training situation. Essential evaluative criteria such as those found in experimental or quasi-experimental designs are examined, but an additional component, cost analysis, is included. The present funding constraints in all areas of military training, and training research and develoment require that adequate consideration be given to the initial choice of alternative training and educational philosphies, methods, and media with respect to relative cost-effectiveness. This means that alternatives must be considered not only on the basis of outcomes but also in terms of the resources required to accomplish the level of effectiveness that is required or desirable. Secondarily, tools are needed for allocating these resources and re-evaluating them on a timely basis. Even though a training course remains static, earlier findings may become invalid without some continuing means of cost-effectiveness monitoring. (Author)

AD-A091 243/6 PC **A04**/MF **A01**
Navy Personnel Research and Development Center, San Diego, CA.
Validity of a Battery of Experimental Tests in Predicting Performance of Navy Project 100,000 Personnel.
Final rept.,
Charles H. Cory, Nancy E. Neffson, and Bernard Rimland. Sep 80, 67p Rept no. NPRDC-TR-80-35 See also Rept. no. AFHRL-TR-76-69, AD-A042 605.

This report summarizes results of a four-phase study that originated as part of the Project 100,000 research effort. The purpose of the study was to develop 'culture fair' aptitude tests that would permit the Navy to identify potentially successful

recruits from those who scored low on conventional tests. Nineteen experimental tests/questionnaires were developed to measure practical (as opposed to academic) mental abilities. The experimental instruments were divided into four batteries, each of which was administered to a separate sample ranging in size from 5,000 to 12,000 recruits. The instruments were validated against supervisory performance ratings, rating progression, and retention criteria for sample members. Separate analyses were done for Mental Level IVs, Blacks, and for apprenticeship level (nonrated, undesignated strikers) and technical rating groups. The findings were generally negative. With only a few exceptions, the experimental tests were not valid predictors of on-job performance for any of the subgroups studied, and were less valid than the conventional tests for predicting either job performance or rating advancement. Also, because of the wide variety of 'culture fair' tests evaluated, it is unlikely that paper-and-pencil tests can be found that will identify previously overlooked aptitudes in low-ability populations.

AD-A091 251/9 PC **A04**/MF **A01**
Navy Personnel Research and Development Center, San Diego, CA.
Shipboard Instruction and Training Management with Computer Technology: A Pilot Application.
Technical rept. Mar 76-Nov 78,
John A. Dollard, Mitchell L. Dixon, and Patrick H. McCann. Sep 80, 55p Rept no. NPRDC-TR-80-34

To determine if computer technology could improve shipboard instruction and training, an Automated Shipboard Instruction and Management System (ASIMS) was used for computer-managed instruction (CMI) aboard USS GRIDLEY (CG 21) during 1975-77. ASIMS comprised a NOVA 1200 minicomputer with support peripherals, a Computer Integrated Instruction (CII) system in General Damage Control (GDC), and a Shipboard Training Administration System (STAS). CII GDC provided off-line instruction integrated with on-line computer testing, diagnostics, and prescriptives. STAS provided a generalized File Management and Information Retrieval System (FMS) that facilitated control of shipboard files, records, and reports. Posttest scores indicated that graduates of the CMI course significantly outperformed groups trained under conventional shipboard methods. CMI was proved technically and operationally feasible aboard ship and it was shown that commercial, off-the-shelf minicomputer systems can support both a CMI capability and limited nontactical ADP functions. A cost-effectiveness study was beyond the scope of the project.

AD-A091 380/6 PC **A05**/MF **A01**
Air Force Occupational Measurement Center, Randolph AFB, TX.
Aerospace Physiology Career Ladder AFSC 911X0.
Occupational survey rept.
Aug 80, 92p

The Aerospace Physiology career ladder job inventory was administered worldwide to job incumbents in all commands. The 334 survey respondents represent 80 percent of the total assigned AFSC 911X0 personnel. Analysis of the specialty structure revealed that differences between the jobs which incumbents perform are a function of the types of equipment and mission objective of the base where personnel are assigned. Most job groups emphasize operating and maintaining hypobaric chambers and other types of training equipment used to provide aerospace physiology training for aircrew personnel. Smaller groups, such as Hyperbaric Medicine Personnel and Physiological Research Technicians, performed more unique jobs involving aerospace physiology equipment. In addition, pressure suit and life support equipment functions performed at Beale AFB and Edwards AFB are considerably different from other jobs because of the support role of 911X0 incumbents at these locations. Survey data indicate that strong formal training programs are necessary to provide adequate training for career ladder incumbents.

AD-A091 383/0 PC **A03**/MF **A01**
Michigan State Univ., East Lansing. Dept. of Psychology.
The Entry of Newcomers Into Organizations.
Research rept. no. 1,
John P. Wanous. Jul 80, 28p
Contract N00014-79-C-0781

The organizational entry process concerns how newcomers and organizations get matched to each other. This involves the twin processes of matching a job candidate's abilities to organizational job requirements, and matching a person's needs to the climates in an organization. Research in four areas is briefly reviewed: how individuals and organizations learn about each other, the consequences of job candidates and company recruiters trying to sell themselves to each other, how individuals decide which organization to enter, and how organizations decide which job candidate to select. (Author)

AD-A091 387/1 PC **A04**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH.
The Effect of Educational Attainment on the Job Satisfaction Level of Correctional Officers.
Master's thesis,
Robert William Baker. 1979, 69p Rept no. AFIT-CI-79-178T

The primary objective of this study was to ascertain the relationship between the educational attainment of correctional officers and their job satisfaction levels. A secondary objective was to ascertain the effect of one's educational attainment on his or her work alienation level. The findings suggest that correctional officers are relatively satisfied with their jobs and exhibit little work alienation. While no relationship was found between their educational attainment and their work alienation levels, an inverse relationship between their educational attainment and their job satisfaction levels was found to exist under certain conditions. This relationship was particularly prevalent in the response patterns of the younger and better-educated line correctional officers. The relationship did not hold among officers older than forty-five or among officers in supervisory positions. It is concluded that increasing the educational attainment of correctional officers without modifying their job skill requirements accordingly will most likely result in a lower level of job satisfaction. This is likely to be particularly true among the younger and better-educated officers. As a result, such officers will likely leave the corrections field and aggravate the existing high rate of personnel turnover. The findings of this study are consistent with the conclusion of the National Manpower Survey of the Criminal Justice System in 1978 that line correctional officers may not need a higher education to perform their present duties.

AD-A091 391/3 PC **A03**/MF **A01**
Army Soldier Support Center, Fort Benjamin Harrison, IN.
Soldier Capability-Army Combat Effectiveness (SCACE) Study.
Study progress rept.,
Juri Toomepuu. Oct 80, 26p
Presented at the Annual U.S. Army Operations Research Symposium (19th), 14-17 Oct 80, Fort Lee, VA.

Combat, training test, and field experiment data indicate that the capability of soldiers is the major determinant of the combat effectiveness of weapons, and the dominant factor in the outcome of battles. It follows that it is not appropriate to use, in defense analysis and planning, weapon and force effectiveness indices that are based on design effectiveness of weapons, in lieu of effectiveness figures achievable with real-world troops under field conditions. A concept for derivation of Soldier Capability Factors (SCAFs), based on quantitative data on the relationships of soldier capabilities and combat effectiveness, is presented. Integration of SCAFs into weapons effectiveness measures and combat models can be expected to result in far-reaching improvements in the war games and analyses that form the foundation for the Army planning, programming, and resource allocation processes. It is proposed that SCAFs be validated and refined by experiments conducted at the Army National Training Center, using the latest engagement simulation technology. (Author)

AD-B009 345/0 PC **A07**/MF **A01**
Center for Naval Analyses Arlington VA Operations Evaluation Group
Manpower Planning Handbook. Volume III. NavCommSta Receiver Site.
Research contribution,
Bernard H. Rudwick, Michael E. Melich, Janice L. Kofman, and Catherine E. Anderson. Jan 76, 145p Rept no. CRC-286-Vol-3
Contract N00014-68-A-0091-0018
See also Volume 2, AD-B007 419L.
Distribution limitation now removed.

Results of the receiver site manpower planning analysis are presented. The work systematically relates manpower requirements at each Naval communications station to the communications services it provides. (Author)

AD-B014 560/7 PC **A11**/MF **A01**
Center for Naval Analyses Arlington VA Operations Evaluation Group
Manpower . Planning Handbook. Volume IV. NavCommSta Fleet Center Division.
Research contribution,
Bernard H. Rudwick, Michael E. Melich, Janice L. Kofman, Catherine E. Anderson, and Laura H. Nunn. Aug 76, 249p Rept no. CRC-286-Vol-4
Contract N00014-68-A-0091-0018
See also Volume 3, AD-B009 345L.
Distribution limitation now removed.

Results of the fleet center manpower planning analysis are presented. The work systematically relates manpower requirements at each Naval communications station to the communications services it provides. (Author)

AD-014 441 MF **A01**
Air Force Personnel and Training Research Center, Lackland AFB, TX.
A Preliminary Investigation of Trouble Shooting
ELI SALTZ, and JOHN V. MOORE. 20 Feb 53, 10p Rept no. tr53 2
Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche.

No abstract available.

BNL-51164 PC **A05**/MF **A01**
Brookhaven National Lab., Upton, NY.
Staff Roster for 1979-Energy Sciences Programs.
B. Manowitz, and D. H. Gurinsky. Dec 79, 82p
Contract AC02-76CH00016

This publication lists the education, research interests, professional affiliations, committee memberships, research experience, and selected publications of BNL staff members in energy sciences programs. (ERA citation 05:037453)

BNL-51170 PC **A05**/MF **A01**
Brookhaven National Lab., Upton, NY.
Staff Rosters for 1979: Environmental Programs.
Dec 79, 99p
Contract AC02-76CH00016

The roster of the scientific and professional staffs of the Environmental Programs of the Department of Energy and Environment has been compiled as of December 1979. Staff members have been listed according to their organizational units, i.e., the Atmospheric Sciences Division, the Environmental Chemistry Division, the Oceanographic Sciences Division, and the Land and Freshwater Environmental Sciences Group. Educational background, research interests, professional activities, summary of experience at BNL, and selected publications have been included for each member listed. (ERA citation 05:035026)

ED-181 903 Not available NTIS
A Department-Wide Undergraduate Teaching Laboratory Using Microcomputers,
C. Michael Levy. 1979, 10p
Paper presented at the Annual Meeting of the American Psychological Association, San Francisco, CA. April 9-11, 1979.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

Time, space, money, and educational opportunities were the four major factors considered in upgrading the individual teaching labs at the University of Florida. The program incorporates the use of single processor microcomputers to teach a variety of courses. Software developed for a course on cognition and perception will set up a ready to run experiment, present the stimuli, collect the data responses, and do a number of transformations of the raw data. The essence of the approach is the use of the computer as the students' personal lab assistant--the students can serve either as the subject or the experimenter. Another approach uses the computer and videotape in combination to solve problems. The costs of setting up a computer-based undergraduate teaching lab are also briefly discussed, as well as the availability of instructional courseware.

ED-181 905 Not available NTIS
Xerox Corp., Rochester, NY.
Training Program Design: Standards Manual,
Travis Piper, and Mike Mumma. 1976, 85p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210. Also available from Daniel J. Vitello, Xerox Square, Location 850, Rochester, NY 14644 (additional information and/or CAI course on computer tape).

CAI201, a training program that takes students through the training program design process, is conducted via computer assisted instruction (CAI), and is directed toward the individual who has been charged with designing a training program but who lack and understanding of how to proceed. This manual provides the program designer with background information to assist him or her in performing the program design steps: actual performance of these steps is accomplished by use of the worksheets and forms contained in the companion manual, 'The Design Documentation Package.' At the end of the course, the student should have designed a training program. Available at any time, the course may be taken at the student's own pace; it runs under the IBM program products, ITS and IIS.

ED-181 923 Not available NTIS
Computer-Managed Correspondence in Large Lecture Courses,
Lawrence W. Sherman. 2 Sep 79, 11p
Paper presented at the Annual Convention of the American Psychological Association (87th), New York, September 2, 1979.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

The effects of computer managed personal correspondence from instructor to students in three large lecture sections of an introductory educational psychology course are examined. One section received no correspondence while the second received two and the third four personally signed letters. All letters were personally addressed to each student. Contents of the letters along with the procedures utilized to mail them and the computer programming are described. University sponsored student-course-professor survey data along with data from an additional instructor-made survey suggest that these letters improve students' perceptions of the class and instructor and are a highly positive and desirable public relations technique.

ED-181 924 Not available NTIS
Human Resources Research Organization, Alexandria, VA.
On-Line Authoring Aids for Instructional Design,
Russel E. Schulz. Jul 79, 199p ARI-TR-387
Contract DAH-19-76-C-0041
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

Since the usefulness of the Interservice Procedures for Instructional Systems Development (IPISD) depends on authoring aids which enable personnel to translate IPISD procedures into instructional products, this project examined the feasibility of providing such 'how to do it' guidance for the instructional design and development tasks identified for Block II.2-Develop Tests and Block III.4-Develop Instruction. Online authoring aids were developed to be used on the PLATO IV Computer-Assisted Instruction (CAI) system, as well as off-line versions, to assist the author in preparing materials for both CAI and non-CAI delivery of instruction. The three levels of evaluation conducted included as informal evaluation on existing IPISD materials, a formative evaluation of the newly developed authoring aids, and as evaluation of the instructional materials produced. Findings were positive--user acceptance of the authoring aids was high, and the time required for development of test and lesson material was significantly reduced. Based on these findings, the development of such aids for additional blocks of the IPISD model have been initiated. Flowcharts for both the two blocks studied and the authoring aids are provided, and a 97-item bibliography is attached.

HRP-0902573/5 PC **A05**/MF **A01**
Mid-Louisiana Health Systems Agency, Baton Rouge.
Orientation Handbook for Volunteers.
Aug 80, 89p
Sponsored in part by Bureau of Health Planning, Hyattsville, MD.

Updated to reflect Public Law 96-79 (1979 amendments to the health planning program), this handbook presents information on the following topics: (1) nature and evolution of health planning; (2) agency organization and operating procedures; (3) plan development; and (4) review responsibilities. Volunteer rights and responsibilities are delineated. A board member's need to ask questions during the decisionmaking process is stressed, and questions are suggested relating to need, effect, cost, and consistency with the health systems plan. Factors contributing to controversy in health planning are identified. General information on the plan development and review processes is supplemented by agency-specific guidelines. Glossary, committee rosters are presented.

PB80-928012 PC **E09**/MF **A01**
Central Intelligence Agency, Washington, DC.
OECD Countries: Unemployment in the 1970s and Perspectives for the 1980s.
Research paper.
Nov 80, 61p ER-80-10579
Paper copy also available on Standing Order, Deposit Account required. North American Continent price based on page count of individual documents; all others write for quote. This series offers a reduction in price as a Standing Order, PB80-928000.

The report examines supply and demand factors affecting unemployment in the major industrial countries in the 1970s and looks at several scenarios for unemployment in the 1980s. The data and analysis in this report will likely be of considerable interest to a wide range of government and private institutions.

PB81-109753 PC **A11**/MF **A01**
North Carolina Univ. at Chapel Hill. Highway Safety Research Center.
Requirements Analysis for a Heavy Vehicle Licensing System.
Final rept. 1 Apr 78-31 Oct 79,
Patricia F. Waller, and Livia K. Li. Sep 80, 239p
DOT-HS-805-553
Contract DOT-HS-7-01807

The project addressed the licensing requirements for drivers of heavy trucks and the feasibility of federal licensing of these drivers. Data analyses indicate that heavy trucks pose a problem, but many of the key questions cannot be adequately answered on the basis of available data. Although the Bureau of Motor Carrier Safety (BMCS) and state regulatory authorities have responsibility for the qualification and monitoring of many of the drivers of concern, in actual practice they are unable in insure that all drivers are qualified. This situation underscores the need for an effective licensing and monitoring system. Licensing recommendations cover verifications of driver identity; medical requirements; vision, knowledge, and skills testing; and an interstate identification file that is checked whenever license is first issued in any state. It is recommended that existing state programs in licensing, records, and enforcement be used in establishing an effective licensing program. Federal Standards with enforceable sanctions will probably be necessary to encourage states to upgrade their programs. However, a cooperative state program should be far more effective and less costly than a federal licensing program.

PB81-116485 MF **A01**
National Research Council, Washington, DC.
Analytical Studies for the U.S. Environmental Protection Agency. Volume V. Manpower for Environmental Pollution Control.
Aug 77, 448p ISBN-0-309-02634-2
Contract EPA-68-01-2430
Library of Congress catalog card no. 77-85200.
Microfiche copy only. Paper copy available from: National Academy of Sciences, 2101 Constitution Avenue, N.W., Washington, DC. 20418. PC $11.25.

The report endeavors to set guidelines for achieving a well-coordinated environmental manpower program, analyzing the best available data and interpreting the relevant gaps in the body of knowledge in this field. Appendixes to the main report supply information on the legal aspects of EPA's role in developing environmental personnel, on the methodology and analysis of manpower data, and on current and future demands for environmental manpower by federal, state, and local governments and by industry and private sectors.

PB81-118887 PC **A16**/MF **A01**
California Univ., San Francisco.
Non-Family Medicine Resident Training for Primary Care: A Comparative Evaluation of Federally and Non-Federally Supported Primary Care Oriented Medical Residency Programs.
Final rept. 1 Jul 78-30 Jun 80,
Edwin F. Rosinski, and Fred Dagenais. Jun 80, 369p BHM-75-2
Contract PHS-HRA-232-78-0115

In the early 1970's the Robert Wood Johnson Foundation and the Federal Government embarked on supporting nonfamily medicine residencies in primary care. A study was undertaken of these first sixteen residencies to determine if (1) there was any significant difference between the Foundation and Federally supported programs, and (2) what conclusions and recommendations could be drawn regarding residency training for primary care. The study utilized detailed questionnaires and site visits to interview approximately 350 individuals involved in the residency programs. The study focused on problems encountered in starting and continuing the programs, the programs' objectives, the kinds of clinical affiliations used, staffing patterns, the background of the residents, the patient population served by the programs, a description of the programs, the kind of patient care and educational activities in which the residents engaged, evaluation of the programs, patterns of funding, and finally what was being done to 'institutionalize' them. In addition to all of the hard data collected and included in the tables and figures, considerable anecdotal evidence was collected which deals with attitudes and perceptions about the programs, the residents, and future plans of the residents in primary care.

PB81-119927 PC **A09**/MF **A01**
Westat, Inc., Rockville, MD. Research Div.
The Net Earnings Impact of the Public Employment Program (PEP): An Exploratory Analysis.
Final rept. 1971-75.
Oct 79, 191p MEL-79-20
Contract DL-23-24-75-07

The report summarizes the results of a methodological exploration in which longitudinal data on a panel of enrollees in the Public Employment Program (PEP) was used to estimate PEP's impact on the post-program earnings of participants. A comparison group was drawn from the Current Population Survey (CPS) and earnings data for both the participant and comparison groups were drawn from Social Security earnings records. This report demonstrates the feasibility of this approach to evaluating employment and training programs and serves as the prototype of evaluations that will be conducted using the Continuous Longitudinal Manpower Survey. Because actual data was used in testing this methodology, estimates of PEP's impact on participant earnings were derived. The report presents and analyzes these results.

PB81-121329 PC **A03**/MF **A01**
Office of Personnel Management, Washington, DC. Personnel Research and Development Center.
College Grade Point Average as an Indicator of Occupational Success: An Update.
Personnel research rept.,
Brian S. O'Leary. Aug 80, 27p PRR-80-23

Evidence of undergraduate academic achievement has often been used as part of the examination process for entry into many federal occupations. Frequently concern is raised about the job-relatedness and validity of such selection programs. The objective of this project was to examine and summarize the literature relating college grade point average to job performance.

PB81-121352 PC **A02**/MF **A01**
Office of Personnel Management, Washington, DC. Personnel Research and Development Center.
The Selection Interview: A Review of the Literature.
Personnel research rept.,
Ronald Karren. Aug 80, 23p PRR-80-22

The purpose of this report is to review the relevant literature on the interview and to evaluate the interview as a selection device. Despite the research evidence which claims that the selection interview lacks both reliability and validity, the interview continues to be the most widely used selection device and requires further study. The first section of this report reviews the interview research, with special consideration given to decision making processes and biases. The second section considers the legal aspects of the interview and reviews some of the most relevant court cases. The third section reviews the research concerning differential evaluations of minority group candidates. The concluding section summarizes the research on reliability, validity, adverse impact, and decision-making processes, and includes a methodological framework for implementation and suggestions for further research.

PB81-121469 PC **A04**/MF **A01**
American Univ., Washington, DC. Inst. for Applied Public Financial Management.
Adjustments Needed to Improve FmHA's Present Training System for County Supervisors.
Final rept.,
Berry Wright. Oct 79, 61p
Sponsored in part by Farmers Home Administration, Washington, DC.

The project is a study of Farmers Home Administration's (FmHA) present training system for preparing its County Supervisors to assist farm applicants and borrowers in accomplishing loan objectives. The primary objective is to enable borrowers to obtain credit from conventional sources.

PB81-121477 PC **A08**/MF **A01**
Associate Consultants, Inc., Washington, DC.
Validation of Grant Agreement Narratives and Base Data Used.
Final rept.
Nov 79, 153p DLETA-20-11-78-59-1
Contract DL-20-11-78-59

This was a study of how various types of CETA prime sponsors obtained, used and validated data to design and carry out their programs. A representative sample of prime sponsors--city, county and balance-of-State prime sponsors--was selected, visited, observed and interviewed.

PB81-121550 PC **A09**/MF **A01**
System Sciences, Inc., Bethesda, MD.
Hemodialysis Home Training Manual for Experiment in End-Stage Renal Disease.
Interim rept.,
Nancy Sharp. Apr 78, 189p HCFA/ORDS-78/54
Contract DHEW/HCFA-600-77-0126

The hemodialysis training manual was prepared by System Sciences, Inc., under contract to the Health Care Financing Administration. The manual was compiled from the combined resources of the 15 dialysis facilities participaing in the Paid Aide Demonstration to establish minimum training requirements. The curriculum is designed to be taught as a four-week (five day per week) program. Three major categories are addressed in the curriculum: patient and self-care information, vascular access and care, and the machine and related procedures. Protocols for home training and home supervision are included. The objectives and philosophy of self-care dialysis are stressed and include increasing the patient's rehabilitation potential and responsibility for his/her own dialysis. Sample dialysis procedures are included which are divided into components of initiation, monitoring, and termination activities. Sample examinations, flow sheets, teaching checklists, safety checklists, and home visit forms are included as an appendix.

PB81-121808 PC **A09**/MF **A01**
Veterans Administration, Washington, DC.
A Program for the Development of Supervisors, Veterans Administration Hospital, East Orange, New Jersey,
Hazel J. Burleson. Oct 66, 180p VA/NPR-26

The object of this project was to study, plan and organize a format for a program for the development of supervisors based on expressed and implied needs, an accepted philosophy of nursing, accepted principles of supervision and VA directives and guides. The conclusions reached were that supervisors were performing their duties with a routinized task-oriented approach, an ill-defined understanding of the dual responsibility of supervision with respect to patient and administrative detail and a notable lack of ability to identify functional areas of responsibility. Because of time limitations, it was not possible to pursue the original intent of the project to completion. The writing of functions therefore was the major phase of this project. As a result of the needs identified during this study, and further needs expressed by supervisors during the major phase of the project, recommendations for further supervisory development were made. Included are an appendix and bibliography.

PB81-123051 PC **A09**/MF **A01**
Young (Arthur) and Co., Washington, DC.
Conglomerate Use of Exemptions to the Fair Labor Standards Act of 1938.
Final rept.
13 Nov 80, 189p
Contract DL-J-9-M-9-0206

The purpose of the study was to measure the extent of use by conglomerates of exemptions to the minimum wage and overtime provisions of the Fair Labor Standards Act. A working definition of a conglomerate is included in the study (executive summary). The industries included in the study for minimum wage and overtime exemptions are: seasonal amusement parks, fishing and seafood operations, small newspapers, small phone companies and foreign flag shipping. The industries included in the study for overtime exemptions are: retail or service, agricultural employees of certain operations, transportation, dairy products, steamships, small radio and TV stations, motor vehicle, boat and air plane dealers, local trucking, maple syrup processors, taxicab drivers, movie theater employees and lumbering and forestry employees.

PB81-123291 PC **A08**/MF **A01**
Veterans Administration, Washington, DC.
A Study of the Current R.N. Orientation Program, Veterans Administration Hospital, Long Beach, California,
Laura V. Carver. 1966, 158p VA/NPR-23
Portions of this document are not fully legible.

The study includes composite opinions of staff members before and after revision of the new orientation program. Information gleaned at periodic steps during and after the orientation of sixteen nurses was felt to be most significant. Although the results of this study are not conclusive, the findings suggest that: the orientation of nurses should hold high priority in a staff development program; the well-informed employee seems to relate more completely to the overall philosophy and objective of the Nursing service; the cohesiveness of this program seems to be enhanced by having specific wards structured for this responsibility; an individualized structured program is a new experience and is appreciated; and that the success of an individualized orientation program requires maximum continuous cooperation and coordination between service and education.

PB81-125478 PC **A15**/MF **A01**
Office of Personnel Management, Washington, DC. Office of Labor-Management Relations.
Index of Federal Labor Relations Cases.
1 Jul 80, 336p OPM/OLMR-80-7
See also report dated Jul 79, PB-300 963.Portions of this document are not fully legible.

The INDEX contains Federal sector ARBITRATIONS and case determinations of the Federal Service Impasses Panel (FSIP), the Federal Labor Relations Authority (FLRA), and selected decisions of the Federal Employees Appeals Authority (FEAA), the Comptroller General (CG), the Federal Court System, and the Merit Systems Protection Board (MSPB). It also includes case determinations of the Federal Labor Relations Council (FLRC) and the Assistant Secretary for Labor-Management Relations (A/SLMR) issued under E.O. 11491. MSPB decisions are combined with FEAA cases and listed under the MSPB heading. These decisions are indexed and listed (beginning on page 1) by the subject matter(s) which they address.

PB81-125486 PC **A06**/MF **A01**
Office of Personnel Management, Washington, DC. Office of Labor-Management Relations.
Digest of Labor Arbitration Awards in the Federal Service. Supplement Number 7.
Jul 80, 118p OPM/OLMR-81/1
See also Supplement No. 6, PB80-209893. Errata sheet inserted.

The report is the 7th of periodic supplements to the March 1978 Digest of Labor Arbitration Awards in the Federal Service. It provides subject headnotes, statements of issue, and summaries of the award and its basis, for additional arbiration cases as of July 1980. It also indicates the parties, the arbitrator, and the date of the award.

PB81-800732 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Volunteers in Social and Community Affairs. 1964-November, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-Nov 80,
Mary E. Young. Nov 80, 148p
Supersedes PB80-800410, and NTIS/PS-78/1090.

Reports on recruiting, training, and utilization of volunteer workers in service projects are cited, including projects in rehabilitation, probation and parole, services to the elderly and handicapped, police patrol supplements, and pretrial intervention. Reports on citizen participation in governmental planning and management decisions are excluded. (This updated bibliography contains 141 citations, 12 of which are new entries to the previous edition.)

5J. Psychology (Individual and Group Behavior)

AD-A090 899/6 PC **A02**/MF **A01**
Walter Reed Army Inst. of Research, Washington, DC.
Economic Concepts for the Analysis of Behavior,
Steven R. Hursh. 26 Nov 79, 21p
Pub. in Jnl. of the Experimental Analysis of Behavior, v34 n2 p219-238 Sep 80.

No abstract available.

AD-A090 930/9 PC **A04**/MF **A01**
Human Engineering Lab., Aberdeen Proving Ground, MD.
Index for an Annotated Bibliography of the Literature Dealing with the Physiological Correlates of Cognitive Performance,
Diane M. Kuhl, and Nicholas J. Carriero. Aug 80, 61p

This index classifies the studies which appear in: 'An Annotated Bibliography of the Literature Dealing with the Physiological Correlates of Cognitive

Performance.' (Carriero, et. al., 1978). The studies are grouped under approximately 400 index terms. (Author)

AD-A091 075/2 MF **A01**
Market Facts, Inc., Washington, DC. Public Sector Research Group.
Youth Attitude Tracking Study: Spring 1980.
Survey rept.
Aug 80, 214p
Contract MDA903-78-C-0396
Availability: Microfiche copies only.

This is the tenth of a series of bi-annual youth surveys to gauge youth propensity to enlist, perceptions of military service, sources of information about the military and youth goals and aspirations. (Author)

AD-A091 214/7 PC **A04**/MF **A01**
West Virginia Univ., Morgantown.
Informant Accuracy in Social Network Data V: An Experimental Attempt to Predict Communication from Recall Data.
Interim rept.,
H. Russell Bernard, Peter D. Killworth, and Lee Sailer. 1 Sep 80, 59p Rept no. BK-120-80
Contract N00014-75-C-0441, Grant NSF-IST78-12801
Prepared in cooperation with Florida Univ., Gainesville. Dept. of Anthropology, Pittsburgh Univ., PA. Dept. of Anthropology and Cambridge Univ. (England). Dept. of Applied Mathematics and Theoretical Physics.

This paper seeks to discover whether the known inaccuracy of informant recall about their communication behavior can be accounted for by experimentally varying the time period over which recall takes place. The experiment took advantage of a new communications medium (computer conferencing) which enabled us to monitor automatically all the interactions involving a subset of the computer network. The experiment itself was administered entirely by the computer, which interviewed informants and recorded their responses. Variations in time period failed to account for much of the inaccuracy, which continues, as in previous experiments at an unacceptably high level. One positive finding did emerge: although people do not know with whom they communicate, people en masse seem to know certain broad facts about the communication pattern. All other findings were negative. For example, it is impossible to predict the people an informant claimed to communicate with but did not; and it is impossible to predict who the five people are that an informant forgot to mention that she or he had had communication with. Thus, despite their presumed good intentions, what people say about their communications bears no resemblance to their behavior. This immediately makes suspect all forms of data gathering, based on questions which require that informants recall their behavior. (Author)

AD-A091 219/6 PC **A02**/MF **A01**
Human Engineering Lab., Aberdeen Proving Ground, MD.
Suppression of the Auditory Frequency Following Response during Visual Attention.
Final rept.,
Lynn C. Oatman, and B. Wayne Anderson. 7 Nov 79, 14p Rept no. HEL-TM-20-80
Pub. in Electroencephalography and Clinical Neurophysiology, v49 p314-322 1980.

No abstract available.

AD-A091 350/9 PC **A02**/MF **A01**
Naval Health Research Center, San Diego, CA.
Consulting to Children in Crisis,
John Looney, Richard H. Rahe, Richard Harding, Harold W. Ward, and William Liu. 1979, 12p Rept no. NAVHLTHRSCHC-78-13
Pub. in Child Psychiatry and Human Development, v10 n1 p5-14 Fall 1979.

No abstract available.

AD-A091 374/9 PC **A02**/MF **A01**
Australian Military Forces, Canberra. Psychological Research Unit (1).
Catalogue of Australian Army Psychology Corps Research Projects. 1979.
Technical note,
T. A. Thurbon. Mar 80, 9p Rept no. TN-1/80

This catalogue of research conducted during 1979 is produced in accordance with the Operating Handbook for the Australian Army Psychology Corps 2D-3. It consists of all projects which were undertaken within the Corps which progressed to a stage where they were identifiable by a title. The catalogue summarises the returns of research submitted by all AA Psych Corps Units/Appointments.

PB81-118903 PC **A08**/MF **A01**
Michigan Univ., Ann Arbor. Inst. for Social Research.
A Study of the Effects of and Reactions to a Merger on a Company and its Employees,
Mitchell L. Marks, and Philip H. Mirvis. Aug 80, 153p DLETA-91-26-79-22-1
Contract DL-91-26-79-22
Prepared in cooperation with Boston Univ., MA. School of Management.

A case study of organizational and individual reaction to a conglomerate type acquisition is presented. Drawing from organizational and merger literature, a model of acquisition impact is proposed to guide research into the acquisition experience. A variety of data collection methodologies are utilized in the study. Quantitative methods include a comprehensive employee work life attitude survey administered one- and three-years prior to the acquisition and one-year after the acquisition and analysis of organization records. Qualitative methods include interviews with organization members and review of various organizational memoranda, including correspondence, personal notes, and minutes and tapes from management meetings. Application of the research findings to future merger and acquisition situations is discussed.

PB81-121360 PC **A02**/MF **A01**
Office of Personnel Management, Washington, DC. Personnel Research and Development Center.
Documentation of the Constructs Used in Test 500 (PACE) (Professional and Administrative Career Examination).
Personnel research rept.,
Lois C. Northrop. Aug 80, 20p PRR-80-21

The research report explains the rationale behind the selection of the ten item types used to measure the five ability constructs represented in the written examination for the Professional and Administrative Career Examination (PACE). Examples of each of the item types, as they appear in the Sample Questions Booklet sent to all applicants who wish to take the examination, are presented. The correct solution to each question and the method or reason for arriving at it are also given.

5K. Sociology

AD-A090 837/6 PC **A05**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH.
Identification of a Community's Prioritization of its Police Services in Light of Proposition 13 Budget Reduction.
Master's thesis,
Joseph Allen Vogel, and Robert Tracy Wallace. 7 Aug 79, 77p Rept no. AFIT-CI-79-172T

Historically, police departments were derived from society and were as much a part of it as the cohesiveness and interdependence that defines the human community. As policemen became recognized as a unique social group, they began to counteract their segregation by establishing specialized programs to link themselves with elements in the community. These efforts are the basis of contemporary Police-Community Relations programs. Innovative programs and basic police services lead to a wide range of modern police responsibility. The need for organization and integration of these services into the community is the focus of this thesis. California's Proposition 13 provided the impetus for an administrative determination regarding specific reductions in the services provided by a police department. The community of Davis, California was surveyed to involve the community in determining: the type of non-criminal police services necessary, the degree of these services desired, and the prioritization of the services. Public prioritization not only provides a valuable administrative tool, but it also dovetails the police department and its services with community needs. Also, this method provides police with a means to organize their various services and Police-Community Relations programs into an integrated response to community-wide needs. (Author)

AD-A091 090/1 MF **A01**
Naval Postgraduate School, Monterey, CA.
The Identification of Linker Characteristics among Venezuelan Students in the United States.
Master's thesis,
Recaredo M. Del Rosario Hernandez. Jun 80, 185p
Text in Spanish; Portions in English.
Availability: Microfiche copies only.

The process of technology transfer is dependent on personal communication between individuals knowledgeable in new technology and who are willing to share this knowledge with others for the purpose of increasing the benefits to mankind. A modified version of a previously developed situational test for naval officers is used to determine the natural ability among Venezuelan students in the United States to transfer technical information and bring about its adoption. Emphasis is placed on locating and understanding these individuals to improve the effectiveness and efficiency of technology transfer efforts of Venezuelan agencies. Extensive analysis is performed on the results of questionnaires. Conclusions are drawn and recommendations for additional investigaiton are provided. (Author)

AD-A091 285/7 PC **A04**/MF **A01**
Army Science Board, Washington, DC.
Army Science Board Ad Hoc Study Group Report on Human Issues.
Final rept.
Mar 80, 66p

The Army Science Board, through three Ad Hoc Sub-Groups, addressed human issues in terms of responsible organizations, research, and personnel systems maps and models. The consolidated report offers recommendations in each area, with a central recommendation that the Army establish a high level permanent group to coordinate and integrate research, modeling, and policy planning. A coordinated human issues program is deemed essential to increase the efficiency, visibility, priority, and attention to human resources planning. Other recommendations concern the functions of the Army Personnel Systems Committee, the Personnel Program Review Committee, and a suggested permanent support staff. Additionally, personnel implications of new hardware systems need early recognition, with a conclusion that a formal Personnel Planning Package should be required. A strengthened policy research program and user/researcher determined priorities should be developed. Long-term research commitments are recommended, while retaining a short-term, project capability. Improved force effectiveness and force composition models should result from formation of a center of modeling expertise in the Army. (Author)

AD-A091 309/5 PC **A06**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH.
Leftist Terrorist Motivation.
Master's thesis,
Sharon Ann Kalinowski. Aug 79, 106p Rept no. AFIT-CI-79-175T

As international terrorist activities escalate and campaigns across national boundaries and borders increase, the United States is increasingly vulnerable to both internally- and externally-caused terrorist action. This study drew on existing documentation of leftist terrorists' ideological leanings and their motivations as perceived by analysts of this phenomenon. The study was limited to consideration of eight major leftist terrorist groups which operated between 1960-1978: Tupamaros, Irish Republican Army, Palestine Liberation Organiza-

tion, Baader-Meinhof, Japanese Red Army, Weathermen, Black Panthers, and Symbionese Liberation Army. The philosophical influences on each group were examined as were the psychological and sociological motivations ascribed to them. Based upon the relevant data in the sources, theories were derived about the motivation of contemporary leftist terrorists; and these theories were tested as they applied to the eight groups. Several conclusions regarding contemporary leftist terrorism were formulated, and a recommendation for further behavioral study was made.

PB81-113276 PC **A08**/MF **A01**
Texas Univ. at Austin. Dept. of Economics.
Socioeconomic Incentives for Migration from Mexico to the United States: Magnitude, Recent Changes, and Policy Implications.
Final rept.,
Michael E. Conroy, Mario Coria Salas, and Felipe Vila-Gonzalez. Jul 80, 161p
Contract DOS-1722-820142
Prepared in cooperation with Instituto Politecnico Nacional, Mexico City, MX.

The purpose of the report is to present new evidence of the magnitude of recent estimated real wage differentials for low-skill laborers across regions within Mexico and through the Southwestern United States; to show the trend in those wage differentials across recent years, with specific attention to the effect of recent devaluations of the Mexican peso; to broaden the analysis of socioeconomic incentives to a series of measures beyond real wages alone; and to suggest policy implications with respect to migration which emerge from this analysis of changing incentives in the context of broader interrelationships between the two countries.

PB81-113284 PC **A14**/MF **A01**
Texas Univ. at Austin. Dept. of Economics.
Agrarian Structure and Labor Migration in Rural Mexico: The Case of Circular Migration of Undocumented Workers to the U.S.,
Kenneth D. Roberts, and Gustavo Trevino Elizondo. Jul 80, 303p
Contract DOS-1722-820142
Prepared in cooperation with Centro Nacional de Investigaciones Agrarias, Mexico City, MX.

The purpose of the study is to determine the specific agricultural conditions in Mexico which cause off-farm wage labor to take the form of undocumented migration to the U.S. The report reviews economic and anthropological migration literature and develops a migration model which is applied to 4 rural areas of Mexico. The principal conclusion to emerge from this research is that regional agricultural development will not necessarily stem the flow of migratory wage labor to the U.S. The Bajio, which contributed most heavily to the U.S. migration stream, was the most developed of the 4 zones studied, and within this zone there were no significant differences between migrant and nonmigrant households with respect to most economic indicators. Migrant households were found to be significantly larger through the incorporation of more adult members into the extended family. Higher farm incomes in that zone permit more individuals to claim a share of farm production, while lower farm labor requirements and higher cash outlays dictate that the majority of labor by these members will be in off-farm occupations. This household structure encourages U.S. migration by partially off-setting through occupational diversification the higher level of risk associated with this activity.

PB81-117087 PC **A06**/MF **A01**
Sacramento County Health Dept., CA. Comprehensive Driving Under the Influence of Alcohol Offender Treatment Demonstration Project.
First Interim Analysis of Multiple Offender Treatment Effectiveness.
Interim rept. 1 Sep 77-29 Oct 79,
Raymond E. Reis, Jr., and Lewis A. Davis. Apr 80, 108p CDUI-IE-80-2, DOT-HS-805-586
Contract DOT-HS-6-01414

The report is the first interim analysis concerning the effectiveness of the CDUI Project's educational counseling programs for multiple offender DUI's. The State Senate Bill 38 (SB 38) research design had four treatment groups, two forms of group counseling (Skills Workshop and Educational Electic Therapy) provided with or without chemotherapy (Disulfiram). The post-conviction presentence (PCPS) research design, used for clients with only one prior DUI conviction, had a no-treatment Control group and a minimum exposure, Biweekly Contacts Only group in addition to the four Counseling/Chemotherapy groups provided in the SB 38 design. Treatment effectiveness was assessed in terms of recorded accidents, DUI offenses, and total moving violations occurring subsequent to random assignment. Survival analysis was used to compare these traffic safety criteria between treatment groups.

PB81-117152 PC **A06**/MF **A01**
Sacramento County Health Dept., CA. Comprehensive Driving Under the Influence of Alcohol Offender Treatment Demonstration Project.
DUI (Driving Under the Influence) Client Characteristics: An Interim Analysis of the Random Assignment Process.
Interim rept. 1 Sep 77-31 Jul 79,
Raymond E. Reis, Jr., and Lewis A. Davis. Dec 79, 105p CDUI-AE-79-1, DOT-HS-805-587
Contract DOT-HS-6-01414

The report examines the personal characteristics of those traffic offenders convicted of driving under the influence of alcohol (DUI) who comprise the CDUI Project's treatment research sample. The study assesses the degree to which the random assignment process has been successful in distributing Project clients among the various treatment groups, such that the personal characteristics of clients in each group are equivalent. This confirmation of the random assignment process also provides a concise description of persons on whom the determination of treatment effectiveness will be based. Fifteen client characteristics were examined including general demographics, socio-economic data, arrest and court related information, and diagnostic information. These characteristics were compared between treatment groups for each of three principal research designs, one for first offender DUI's and two for multiple offender DUI's. A composite of the two multiple offender samples was also analyzed.

PB81-119950 PC **A04**/MF **A01**
Denver Univ., CO. Center for Social Research and Development.
Indian Child Welfare: A State-of-the-Field Study. Summary of Findings and Discussions of Policy Implications.
1978, 52p DHEW/PUB/OHDS-78-30096
Contract DHEW-100-75-0177

The Survey was an extensive report on the needs and practices of child welfare services delivered to American Indian children and their families on and off the reservation. The Survey included on site examination of the delivery of services at seven off reservation sites and at ten reservations, with a supporting survey of formalized policies in 21 States with Native American populations. The project has also identified key elements of social work education and practice provided to American Indians, as well as recommendations for improving their educational and employment opportunities in social work fields.

6. BIOLOGICAL AND MEDICAL SCIENCES

6A. Biochemistry

AD-A091 396/2 Not available NTIS
Letterman Army Inst. of Research, San Francisco, CA.
Influence of Cycloheximide and 1,25-Dihydroxyvitamin D3 on Mitochondrial and Vesicle Mineralization in the Intestine,
Robert L. Morrissey, David T. Zolock, Paul W. Mellick, and Daniel D. Bikle. 8 Aug 79, 11p
Availability: Pub. in Cell Calcium 1 p69-79 1980 (No copies furnished by DTIC/NTIS).

No abstract available.

BNL-28300 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Pigment-Protein Complexes.
H. W. Siegelman. 1980, 3p CONF-800963-2
Contract AC02-76CH00016
International photosynthesis congress, Kassandra-Halkidiki, Greece, 7 Sep 1980.

The photosynthetically-active pigment protein complexes of procaryotes and eucaryotes include chlorophyll proteins, carotenochlorophyll proteins, and biliproteins. They are either integral components or attached to photosynthetic membranes. Detergents are frequently required to solubilize the pigment-protein complexes. The membrane localization and detergent solubilization strongly suggest that the pigment-protein complexes are bound to the membranes by hydrophobic interactions. Hydrophobic interactions of proteins are characterized by an increase in entropy. Their bonding energy is directly related to temperature and ionic strength. Hydrophobic-interaction chromatography, a relatively new separation procedure, can furnish an important method for the purification of pigment-protein complexes. Phycobilisome purification and properties provide an example of the need to maintain hydrophobic interactions to preserve structure and function. (ERA citation 05:037186)

PB80-929614 PC**$4.50**/MF**$3.00**
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Polycyclic Aromatic Hydrocarbons.
Special listing.
13 Nov 80, 4p NCI/ICRDB/SL-417
Supersedes NTISUB/E/296-018.

This Special Listing of Current Cancer Research Projects is a publication of the International Cancer Research Data Bank (ICRDB) Program of the National Cancer Institute. Each Listing contains descriptions of ongoing projects in one selected cancer research area. The research areas include: Metabolism and molecular mechanism of action of aromatic hydrocarbons; Cell transformation by aromatic hydrocarbons and related in vitro studies; In vivo studies of aromatic hydrocarbon carcinogens; Immunological aspects of aromatic hydrocarbon carcinogenesis; Other biochemical effects of polycyclic aromatic hydrocarbons; Detection, synthesis, reactions, and molecular structure of polycyclic hydrocarbons and their derivatives.

PB81-800237 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Biochemistry and Therapy of Cholinesterase Inhibitors. 1964-November, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-Nov 80,
Edward J. Lehmann. Nov 80, 269p
Supersedes PB80-800766, and NTIS/PS-78/1101.

Citations report on cholinesterase inhibitors and reactivators. Most of the studies are concerned with organic phosphorus chemical warfare agents and their effects on cholinesterase. However, some research also discusses insecticides and other toxic chemicals. Along with these citations are abstracts on the effectiveness of several cholinesterase reactivators including aldoximes and pralidoxime chloride. Nerve activity, blood chemistry, biochemical reactions are but a few areas covered. (This updated bibliography contains 262 citations, 13 of which are new entries to the previous edition.)

6C. Biology

AD-A090 832/7 PC **A14**/MF **A01**
Fish and Wildlife Service Fayetteville AR National Reservoir Research Program
Simulation Modeling of Zooplankton and Benthos in Reservoirs: Documentation and Development of Model Constructs.
Final rept.,
George R. Leidy, and G. R. Ploskey. Mar 80, 311p WES-TR-E-80-4
Report on Environmental and Water Quality Operational Studies.

A literature review and analysis of published data on zooplankton and benthos bioenergetics form the basis used in this report for the development of stochastic model constructs for the simulation of zooplankton and benthos dynamics in reservoirs. Parameters reviewed and modeled were selected from the mass balance equation. (Author)

AD-A090 891/3 PC **A02**/MF **A01**
Army Medical Component-AFRIMS, APO San Francisco 96346.
The Salivary Gland Chromosomes of Anopheles (Cellia) dirus (Diptera: Culicidae) of the Southeast Asian Leucosphyrus Group.
Final rept.,
Visut Baimai, Bruce A. Harrison, and Vanida Nakavachara. 1980, 13p
Pub. in Proceedings of the Entomological Society of Washington, v82 n2 p319-328 1980.

No abstract available.

AD-A091 033/1 PC **A03**/MF **A01**
Pittsburgh Univ., PA. Inst. for Statistics and Applications.
Diversity and Dissimilarity Coefficients: A Unified Approach.
Interim rept.,
C. Radhakrishna Rao. Jul 80, 36p TR-80-10, AFOSR-TR-80-0984
Contract F49620-79-C-0161

Three general methods for obtaining measures of diversity within a population and dissimilarity between populations are discussed. One is based on an intrinsic notion of dissimilarity between individuals and others make use of the concepts of entropy and discrimination. A criterion is developed for choosing a measure of diversity in a given class of measures. The Gini-Simpson index of diversity is derived as the solution to a functional equation. (Author)

AD-A091 034/9 PC **A03**/MF **A01**
Pittsburgh Univ., PA. Inst. for Statistics and Applications.
Inference on the Structure of Interaction in Two-Way Classification Model.
Interim rept.,
P. R. Krishnaiah, and M. G. Yochmowitz. Jul 80, 39p TR-80-8, AFOSR-TR-80-0986
Contract F49620-79-C-0161

In this report, the authors give a review of the literature on tests for studying the structure of interaction in two-way classification with one observation per cell. Special emphasis is made on simultaneous test procedures.

PATENT-4 220 725 Not available NTIS
Department of Health, Education, and Welfare, Washington, DC.
Capillary Cell Culture Device.
Patent,
Richard A. Knazek, and Pietro M. Gullino. Filed 3 Apr 78, patented 2 Sep 80, 7p PB81-116626, PAT-APPL-892 853
Supersedes PB-285 526.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The growth of cells within a device containing a bundle of semi-permeable, tubular capillaries is disclosed. The bundle of capillaries is wrapped in an envelope of porous sheet material, thus creating an extra-envelope space into which the cells can migrate for periodic removal without disturbing the main culture within the capillaries. Porous capillaries may also be employed, in place of or in addition to the porous envelope.

PB81-119372 PC **A06**/MF **A01**
Texas Parks and Wildlife Dept., Austin. Coastal Fisheries Branch.
Studies of Shrimp Populations in Selected Coastal Bays of Texas.
Management data series,
Richard L. Benefield, and William B. Baker, Jr. 1980, 106p TPWD-MDS-13, NOAA-80100103

Brown shrimp (Penaeus aztecus) populations were monitored to determine relative abundance, growth and movement in Galveston Bay, Matagorda Bay, Aransas Bay and the lower Laguna Madre. April-May bar seine and trawl sample results indicated a normal emigration of brown shrimp and a June 1979 closed Gulf season was recommended. Abnormal rainfall in 1979 influenced brown and white shrimp (P. setiferus) availability in Galveston Bay. July and September flooding lowered upper bay salinities to near zero and forced small white shrimp from shallow nursery areas into major bays. White shrimp were most numerous during fall and summer. Average sizes of white shrimp collected on commercial shrimping grounds were larger than those in bait bay areas with the exception of Galveston Bay.

PB81-119380 PC **A03**/MF **A01**
Gulf Coast Research Lab., Ocean Springs, MS.
Pilot Study for Menhaden Catch/Effort Log.
Completion rept.,
J. Y. Christmas. Sep 80, 28p NOAA-80100107
Contract NOAA-03-78-D08-0029

In August 1978 the Gulf States Marine Fisheries Commission contracted with the Gulf Coast Research Laboratory for a study that would 'establish a uniform recording system for the menhaden purse seine fishery throughout the Gulf. Data collected would be computerized for storage and analyzed for location, distribution of catch and effort and areal concentration'. Some results of that project are presented in the report.

PB81-120339 PC **A03**/MF **A01**
Washington Univ., Seattle. Inst. for Marine Studies.
International Joint Ventures in World Fisheries, Their Distribution and Development,
Vladimir Kaczynski, and Dominique LeVieil. Sep 80, 37p WSG-80-2, NOAA-80101505
Grant NA79AA-D-00054
Color illustrations reproduced in black and white.

A joint venture is an association of two or more partners who share the risks and benefits of a commercial venture. In world fisheries, such partnerships typically involve private or government interests of a host country and a foreign partner. In this analysis of international joint ventures, certain interrelationships are inherent to their distribution and development. They are: resource abundance and location of the venture; economic status of host and foreign partners and their willingness to enter into cooperative fishery arrangement; the ability of a coastal nation to harvest, process, and consume its biological resources; and the joint venture partners interest (or lack of it) in export opportunities in the world fish commodities market. The report describes international joint ventures developed mostly in the mid to late 1970s.

PB81-120974 PC **A03**/MF **A01**
Texas Parks and Wildlife Dept., Austin. Coastal Fisheries Branch.
Texas Commercial Harvest Statistics, 1978-79,
C. L. Hamilton. Sep 80, 37p MANAGEMENT DATA SER-12, NOAA-80100102

A Continuing program is being conducted to collect data on the commercially harvested finfish and shellfish from Texas bays and from Texas territorial waters of the Gulf of Mexico. During September-August 1978-79 red drum increased 5.2% in landings and 26.0% in value; spotted seatrout increased 4.7% in landings and 34.8% in value. Black drum decreased 3.7% in landings but increased 7.1% in value. Flounder decreased 31.0% in landings and 11.9% in value.

PB81-122574 PC **A05**/MF **A01**
Foras Forbartha, Dublin (Ireland).
Provisional Distribution Atlas of Amphibians, Reptiles and Mammals in Ireland. Second Edition,
Eanna Ni Lamhna. Jan 79, 81p ISBN-0-9500200-95

This Provisional Distribution Atlas of Amphibians, Reptiles and Mammals in Ireland is one of a series of distribution atlases published in 1971. There are slightly over ten thousand records in this atlas and these are presented on the basis of the presence of a species in a 10km square of the Irish Ordinance Survey Grid. Records, which have been subjected to critical scrutiny by a panel of experts, are shown on the maps. These were collected both prior to 1950 and during the period 1950-1978.

PB81-124372 PC **A09**/MF **A01**
State Univ. of New York Coll. of Environmental Science and Forestry, Syracuse.
Freshwater Fishes of New York State. A Field Guide,
Robert G. Werner. 1980, 194p ISBN-0-8156-2222-8, NOAA-80100901

This book is a guide to the fishes of New York's lakes and streams for the amateur naturalist and fisherman. Nature has provided New York with more than 3 1/2 million acres of lakes and 70,000 miles of streams, abundant habitat for many species of fish. Included here are keys to the identification of all the freshwater fishes of New York State, along with discussions of the life history and distribution of 68 of the most common species. Since all of the species of fish found in New York range well beyond the political boundaries of the state and most can be found over all of the northeastern United States and southeastern Canada, this book should be useful to residents and fishermen in neighboring states and provinces as well.

PB81-124976 PC **A02**/MF **A01**
Alabama Dept. of Conservation and Natural Resources, Montgomery.
Restoration of Oyster Resources Lost in a Natural Disaster.
Completion rept. Jul 79-Jun 80,
William J. Eckmayer. Oct 80, 9p NOAA-80101007

Following a severe spring flood and a hurricane in 1979, restoration of Alabama's oyster fishery by planting clam shell began on 2 May 1980 and was completed on 14 June 1980. Four oyster reefs (Cedar Point, Buoy, Kings Bayou and Sand reefs) in Mississippi Sound and Mobile Bay, Alabama, totaling 792.6 acres; were planted with 123,000.99 cubic yards of clam shell. The planting densities ranged from 99.6 to 297.3 cubic yards of clam shell per acre.

6E. Clinical Medicine

AD-A090 844/2 PC **A02**/MF **A01**
Army Medical Research Inst. of Infectious Diseases, Frederick, MD.
Plasmid Isolation in Legionella pneumophila and Legionella-like Organisms.
Interim rept.,
Perry Mikesell, J. W. Ezzell, and Gregory B. Knudson. 22 Aug 80, 19p

Agarose gel electrophoresis was employed to screen nine strains of Legionella-like bacteria and one strain of Legionella pneumophila for the presence of extrachromosomal deoxyribonucleic acid. Cryptic plasmids were found in three of the isolates examined. A purification protocol was devised which consolidates the central tenets of several existing isolation techniques into a single procedure. Plasmid molecular weights were determined to range from 46.6 to 59.8 megadaltons (Mdal). (Author)

AD-A090 845/9 PC **A02**/MF **A01**
Army Medical Research Inst. of Infectious Diseases, Frederick, MD.
Influence of Blue-Green Algae on Survival of Legionella pneumophila in Aerosols.
Interim rept.,

Richard F. Berendt. 25 Sep 80, 14p

The fluid in which blue-green algae (Fischerella sp.) had been grown (algal extract) was investigated for its effect on aerosols of Legionella pneumophila. The bacteria were significantly more stable when suspended in algal extract than in the tryptose-saline solution employed in our previously reported experiments. The stabilizing property of the extract disappeared after dialysis, suggesting that a relatively small molecule was involved. The relationship of this observation to the epidemiology of Legionnaires' disease is discussed. (Author)

AD-A090 846/7 PC **A02**/MF **A01**
Army Medical Research Inst. of Infectious Diseases, Frederick, MD.
Observations on Natural and Laboratory Infection of Rodents with the Etiologic Agent of Korean Hemorrhagic Fever,
H. W. Lee, G. R. French, P. W. Lee, L. J. Baek, and K. Tsuchiya. 3 Jul 80, 23p

Studies were conducted to define the natural host range of Korean hemorrhagic fever (KHF) agent in South Korea, and to identify colonized rodents susceptible to this infection. Eight species of field rodents were captured in areas of Korea endemic for KHF and their tissues were examined by immunofluorescence for the presence of KHF antigen. One hundred and fourteen of 817 Apodemus agrarius coreae captured between 1974 and 1978 and one or more positive organs. No positive organs were found in 239 rodents of the other seven species examined. Two hundred and thirty-eight specimens of Apodemus agrarius jejudoica captured on Jeju island, an area thought to be free of disease, were also negative. Attempted laboratory infection of nine species of rodents captured in the field but maintained in the laboratory was successful only in the two subspecies of Apodemus. The 46 specimens of A. a. jejudoica tested in this manner were all uniformly susceptible to infection as determined by immunofluorescence. Serial sacrifice of experimentally infected A. a. jejudoica revealed viremia of short duration terminating on day 10 post-infection. In contrast, other tissues of this animal, including lung, kidney, liver and parotid gland were positive on day 10 and remained so through the 100-day observation period. When 12 species of colonized laboratory rodents were inoculated with KHF agent five were found to develop KHF antibody by indirect immunofluorescence and two, Calomys callosus and Apodemus agrarius ningpoensis, developed detectable KHF antigen in their tissues. (Author)

AD-A090 848/3 PC **A03**/MF **A01**
Army Medical Research Inst. of Infectious Diseases, Frederick, MD.
Hormones in Infection. Chapter 8. Alterations in Hormone Production and Utilization during Infection,
William R. Beisel. 28 Aug 80, 49p

This chapter reviews the nature of hormonal responses during infectious illnesses. It describes the short-lived adrenocortical response, the biphasic thyroid response, the minimal catecholamine response in the absence of shock, the combined insulin-glucagon response and the variable responses by individual pituitary hormones. Concepts discussed include the severity and duration of infections, differences related to the kind of infection, and endocrine-associated complications of infection.

AD-A090 851/7 PC **A04**/MF **A01**
Yale Univ., New Haven, CT. School of Medicine.
Mechanism of Innate Resistance to Viral Encephalitis.
Final rept. 1 Mar 74-31 Dec 76,
Robert O. Jacoby, and Pravin N. Bhatt. Dec 76, 69p
Contract DAMD17-74-C-4060

Factors that influence the phenotypic expression of genetic resistance or susceptibility to lethal flavivirus infection were investigated in 2 congenic strains of mice: C3H/RV (resistance to lethal infection) and C3H/He (susceptible to lethal infection). C3H/He and C3H/RV mice were equally susceptible to infection by Banzi virus when inoculated intraperitoneally (IP). Encephalitis developed in both strains after IP inoculation and mortality was high in C3H/He mice whereas mortality was low in C3H/RV mice. The difference in susceptibility between the 2 strains, based on mortality, ranged from 10 to the fourth power to 10 to the sixth power LD50. Resistance of C3H/RV mice to lethal encephalitis developed postnatally and did not reach significant levels until mice were 4 weeks old. Resistance was abrogated by cyclophosphamine-treatment, subiethal x-irradiation (400R) and T-cell depletion. Virus yields, distribution of viral antigen and lesions in brain of immunologically crippled C3H/RV mice closely resembled those in untreated C3H/He mice. Infected, cyclophosphamide-treated C3H/RV mice also developed severe pancreatitis. Intracerebral (IC) inoculation of Banzi virus produced high mortality in both strains and virus titers and lesions in brains were also similar. Paradoxically, C3H/He mice given antithymocyte serum had an increased average survival time. Following immunization with inactivated virus and adjuvant both strains of mice withstood IP challenge with virus. In contrast, only resistant mice (C3H/RV) were able to withstand IC challenge. (Author)

AD-A090 880/6 Not available NTIS
Army Medical Research Inst. of Infectious Diseases, Frederick, MD.
Biochemical Characterization of Rift Valley Fever Virus,
Robert M. Rice, Barry J. Erlick, Robert R. Rosato, Gerald A. Eddy, and Sashi B. Mohanty. 11 May 80, 5p
Availability: Pub. in Virology, v105 p256-260 1980 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A090 888/9 Not available NTIS
Army Medical Research Inst. of Infectious Diseases, Frederick, MD.
Glucan-Induced Enhancement of Host Resistance to Selected Infectious Diseases,
J. A. Reynolds, M. D. Kastello, D. G. Harrington, C. L. Crabbs, and C. J. Peters. 1980, 7p
Availability: Pub. in Infection and Immunity, v30 n1 p51-57 Oct 80 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A090 892/1 PC **A02**/MF **A01**
Walter Reed Army Inst. of Research, Washington, DC.
Antibody-Dependent Cell-Mediated Antibacterial Activity of Human Mononuclear Cells. II. Immune Specificity of Antimeningococcal Activity,
Lynette F. Smith, and George H. Lowell. 29 Oct 79, 6p
See also AD-A075 908. Pub. in Jnl. of Infectious Diseases, v141 n6 p748-751 Jun 80.

No abstract available.

AD-A090 901/0 PC **A02**/MF **A01**
Walter Reed Army Inst. of Research, Washington, DC.
Immunization of Aotus trivirgatus Against Plasmodium falciparum with Irradiated Blood Forms,
Bruce T. Wellde, and Carter L. Diggs. 1979, 7p
Pub. in Bulletin of the World Health Organization, v57 suppl 1 p153-157 1979.

No abstract available.

AD-A090 903/6 PC **A02**/MF **A01**
Walter Reed Army Inst. of Research, Washington, DC.
Cutaneous Leishmaniasis Associated with Jungle Training,
Ernest T. Takafuji, Larry D. Hendricks, Joseph L. Daubek, K. Mills McNeil, and Henry M. Scagliola. 13 Oct 79, 7p
Pub. in American Jnl. of Tropical Medicine and Hygiene, v29 n4 p516-520 1980.

No abstract available.

AD-A090 913/5 Not available NTIS
Army Medical Research Inst. of Infectious Diseases, Frederick, MD.
Effects of Infection and Endotoxin on Rat Hepatic RNA Production and Distribution,
W. L. Thompson, and R. W. Wannemacher, Jr. 8 Mar 79, 9p
Availability: Pub. in American Jnl. of Physiology, v238 pG303-G311 1980 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A090 914/3 Not available NTIS
Army Medical Research Inst. of Infectious Diseases, Frederick, MD.
Cardiohepatic and Gross Pathological Changes in Rhesus Monkeys after Intravenous Injection of Purified Cholera Enterotoxin,
C. T. Liu, E. J. Galloway, and P. S. Loizeaux. 22 Nov 79, 6p
Availability: Pub. in Toxicon, v18 p309-314 1980 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A090 915/0 Not available NTIS
Army Medical Research Inst. of Infectious Diseases, Frederick, MD.
Lassa Virus Infection of Rhesus Monkeys: Pathogenesis and Treatment with Ribavirin,
P. B. Jahrling, R. A. Hesse, G. A. Eddy, K. M. Johnson, and R. T. Callis. 15 Aug 79, 10p
Availability: Pub. in The Jnl. of Infectious Diseases, v141 n5 p580-589 May 80 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A090 916/8 Not available NTIS
Army Medical Research Inst. of Infectious Diseases, Frederick, MD.
Immune Responses to Rickettsia akari Infection in Congenitally Athymic Nude Mice,
Richard H. Kenyon, and Carl E. Pedersen, Jr. 1980, 4p
Availability: Pub. in Infection and Immunity, v28 n2 p310-313 May 80 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A090 918/4 Not available NTIS
Army Medical Research Inst. of Infectious Diseases, Frederick, MD.
Adjuvant Activity of a Novel Metabolizable Lipid Emulsion with Inactivated Viral Vaccines,
J. A. Reynolds, D. G. Harrington, C. L. Crabbs, C. J. Peters, and N. R. Di Luzio. 1980, 7p
Availability: Pub. in Infection and Immunity, v28 n3 p937-943 Jun 80 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A090 984/6 PC **A99**/MF **A01**
Foreign Technology Div., Wright-Patterson AFB, OH.
The Experience of Soviet Medicine in the Great Patriotic War 1941-1945,
V. N. Shamov, and B. A. Samotokin. 6 Feb 80, 1595p Rept no. FTD-ID(RS)T-1925-79
Unedited machine trans. of Opyt Sovetskoi Meditsiny v Velikoi Otechestvennoi Voine, 1941-1945 (SSR) v4 p1-547 1949.

No abstract available.

AD-A090 987/9 PC **A02**/MF **A01**
Walter Reed Army Inst. of Research, Washington, DC.
Antigenic Specificity of Antibodies in Vaginal Secretions during Infection with Neisseria gonorrhea,
Edmund C. Tramont, Jennie Ciak, John Boslego, Charles C. Brinton, and Wendell Zollinger. 29 Aug 79, 11p
Pub. in Jnl. of Infectious Diseases, v142 n1 p23-31 Jul 80.

No abstract available.

AD-A090 991/1 PC **A02**/MF **A01**
Walter Reed Army Inst. of Research, Washington, DC.

Anti-Lymphocytotoxic Antibodies in Sera of Thai Adults Infected with Plasmodium falciparum or Plasmodium vivax,
Robert A. Wells, Katchrinnee Pavanand, Barnyen Permpanich, Sandor Zolyomi, and Richard P. Macdermott. 25 Sep 79, 7p
Pub. in Clinical and Experimental Immunology, v39 p663-667.

No abstract available.

AD-A091 041/4 PC **A02**/MF **A01**
Florida State Univ., Tallahassee. Dept. of Statistics.
The Convergence of the State Probabilities in a Class of m-Dimensional Simple Epidemic Models.
Interim rept.,
Herbert Lacayo, and Naftali A. Langberg. Apr 80, 19p FSU-Statistics--M464R, 84-R, AFOSR-TR-80-0996
Grants AFOSR-74-2581, AFOSR-78-3678

A population of susceptible individuals exposed to m contagious diseases is considered. The progress of this epidemic among individuals is modeled by an m-dimesional stochastic progress. The components of this progress represent the number of infective individuals with the respective diseases at time t. A class of m-dimensional stochastic processes is constructed. These processes describe the progress of the epidemic models considered in the sequel. Exact and approximate formulas for the joint and marginal state probabilities of these models are obtained. It is shown that the approximate formulas are very simple functions of time while, the derivation of the exact formulas involve tedious computations. (Author)

AD-A091 097/6 PC **A02**/MF **A01**
Florida State Univ., Tallahassee. Dept. of Statistics.
The Discrete Asymptotic Behaviour of a Simple Batch Epidemic Process,
L. Billard, H. Lacayo, and N. A. Langberg. 14 Jul 78, 9p AFOSR-TR-80-0994
Grants AFOSR-78-3678, AFOSR-76-3109
Pub. in Jnl. of Applied Probability, v17 p25-32 1980. Sponsored in part by Grants AFOSR-74-2581 and PHS-1-R01-GM26851-01.

No abstract available.

AD-A091 178/4 Not available NTIS
Hahnemann Medical Coll. and Hospital, Philadelphia, PA. Dept. of Physiology and Biophysics.
Recovery of Monkeys After Myocardial Infarction with Ventricular Fibrillation. Effects of PGB,
E. T. Angelakos, R. L. Riley, and B. David Polis. 8 Nov 79, 16p
Contract N00014-77-C-0205
Availability: Pub. in Physiological Chemistry and Physics, v12 p81-96 1980 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A091 194/1 PC **A02**/MF **A01**
Armed Forces Radiobiology Research Inst., Bethesda, MD.
Lymphomyelopoietic Activity of Submandibular Gland-Conditioned Medium,
Dale F. Gruber, and G. David Ledney. 3 Jan 80, 9p Rept no. AFRRI-SR80-11
Pub. in Immunology Letters, v1 p227-231 1980.

No abstract available.

AD-A091 196/6 PC **A02**/MF **A01**
Armed Forces Radiobiology Research Inst., Bethesda, MD.
Use of a Modified Rotor and Enlarged Separation Chamber for Isolation of Human Granulocytes by Counterflow Centrifugation-Elutriation.
Scientific rept.,
John F. Jemionek, Thomas J. Contreras, Donald N. Stevens, Fred W. Bernhards, and Dane A. Walden. 20 Aug 79, 17p Rept no. AFRRI-SR80-13
Pub. in Cryobiology, v17 p230-242 1980.

No abstract available.

AD-A091 197/4 PC **A02**/MF **A01**
Armed Forces Radiobiology Research Inst., Bethesda, MD.
Liquid Preservation of Highly Purified Human Granulocytes.
Scientific rept.,
Thomas J. Contreras, John F. Jemionek, John E. French, Virginia M. Hartwig, and Dane A. Walden. 10 Sep 79, 13p Rept no. AFRRI-SR80-14
Pub. in Cryobiology, v17 p243-251 1980.

No abstract available.

AD-A091 250/1 PC **A05**/MF **A01**
RAND Corp., Santa Monica, CA.
Patients' Acceptance of Physician's Assistants in Air Force Primary Medicine Clinics.
Interim rept.,
David Maxwell Jolly. Sep 80, 98p Rept no. RAND/R-2620-AF
Contract F49620-77-C-0023
See also Rept. Nos. RAND/R-2436-AF, AD-A082 491 and RAND/N-1019-HA, AD-A072 510.

This report analyzes the reaction of patient populations to the reorganization of primary medicine clinics at four Air Force hospitals. Called the 'panel system,' the reorganization relied on large numbers of physician's extenders (physician's assistants and primary care nurse practitioners) practicing in teams consisting of two or three extenders and a supervising physician. Each team was assigned a panel of patient families. All visits were to be by appointment. Extenders received favorable ratings from a majority of patients, although from 10 to 20 percent were unfavorable. Even in this group, many felt that PAs could handle some simple medical problems. Most saw the panel system as an improvement and preferred it to an all physician alternative. The new system improved satisfaction with access to care. The results strongly support continued reliance on extenders to provide Air Force primary medical care. (Author)

AD-A091 324/4 Not available NTIS
Army Inst. of Surgical Research, Fort Sam Houston, TX.
Air Evacuation of Thermally Injured Patients: Principles of Treatment and Results,
Richard C. Treat, Kenneth R. Sirinek, Barry A. Levine, and Basil A. Pruitt. 1980, 5p
Presented at the Annual Session of the American Association for the Surgery of Trauma (39th), Chicago, IL., 13-15 Sep 79.
Availability: Pub. in Jnl. of Trauma, v20 n4 p275-279 1980 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A091 340/0 Not available NTIS
Army Inst. of Surgical Research, Fort Sam Houston, TX.
Histamine Receptor Control of Gastric Microvasculature in Shock,
Barry A. Levine, Wayne H. Schwesinger, David Jones, and Kenneth R. Sirinek. 1979, 8p
Presented at the Annual Meeting of the Association for Academic Surgery, 12-15 Nov 78, Cleveland, OH.
Availability: Pub. in Jnl. of Surgical Research, v26 p532-539 1979 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A091 341/8 Not available NTIS
Army Inst. of Surgical Research, Fort Sam Houston, TX.
Redistribution of Zinc within Burned and Burned Infected Rats (40765),
Michael C. Powanda, Ysidro Villarreal, Elisandro Rodriguez, Jr., Guy Braxton, III, and Calvin R. Kennedy. 16 Jul 79, 6p
Presented at the Annual Meeting (63rd) of the Federation of American Societies for Experimental Biology, 1979, Dallas, TX.
Availability: Pub. in Proceedings of the Society for Experimental Biology and Medicine, v163 p296-301 1980 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A091 349/1 PC **A02**/MF **A01**
Air Force Aerospace Medical Research Lab Wright-Patterson AFB OH
The Classification of Spinal Column Deformities Resulting from Aircraft Ejection Forces,
Leon E. Kazarian. 17 Apr 80, 10p Rept no. AFAMRL-TR-80-38
Pub. in American Society of Mechanical Engineers, p1-8 Jul 80. Presented at meeting held 13-15 Jul 80 in San Diego, CA.

No abstract available.

AD-A091 381/4 PC **A02**/MF **A01**
Georgetown Univ., Washington, DC. Lombardi Cancer Center.
Histocompatibility Typing for the Prediction of Susceptibility to Infectious Disease.
Technical rept.,
Armead H. Johnson. Jun 80, 18p Rept no. TR-1
Contract N00014-79-C-0886

The objective of these studies is to determine if susceptibility to certain infectious agents or morbidity associated with infection can be predicted based on knowledge of HLA type. The studies will investigate if certain diseases or disease processes are associated with, or linked to, the HLA region genes. The format of these studies will follow guidelines which include: careful disease classification or subclassification based on firm clinical and laboratory parameters; preparation of data collection forms based on items to be included in the analysis; collection and storage of cells; HLA typing of sample population (random populations exhibiting trait and/or families); and statistical analysis for association or linkage of HLA and disease parameter. The population chosen for the index study comprises individuals who as infants suffered respiratory syncytial virus (RSV) infection, where a small number developed bronchiolitis requiring hospitalization while most recovered with no severe side effects. Association and/or linkage between HLA, virus infection (seroconversion) and morbidity (bronchiolitis) as well as a number of other factors will be evaluated within the random sample population and within families using standard statistical methods.

AD-A091 389/7 PC **A06**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH.
The Effect of Triage on Patient Flow in an Outpatient Clinic.
Master's thesis,
John Wallace Koch. Dec 79, 121p Rept no. AFIT-CI-79-243T

An extensive literature search revealed that the use of various types of appointment systems, the use of allied health personnel, and the use of triage, or the priority sorting of patients, are all major methods currently being used to improve patient flow in health care systems. In an effort to determine the effectiveness of the use of triage in improving patient flow in an outpatient clinic, the operation of the general practice clinic at the Williams AFB Hospital was studied. Results of the study showed that although triage patients had lower provider service times (8.55 min. vs. 12.45 min.), their total service times were significantly longer (68.3 min. vs. 37.5 min.). In addition, these long waiting times were shown to significantly affect patient satisfaction with the service at the clinic as a whole. Furthermore, it was discovered that the use of triage in this manner actually decreased the total number of patients seen in the clinic. However, it was proposed that by using medical technicians rather than physician assistants for screening, and by using modified wave scheduling for the triage patients, total service times could be reduced and the total number of patients seen could be increased without sacrificing the principle of triage.

CEA-CONF-4763 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Service de Protection contre les Rayonnements.
Measurement of the Absorbed Dose Received by Patients Undergoing Lung X-Ray Examination.
G. Petit. 1979, 16p CONF-7909146-2
In French.11. national congress on the control of ionizing radiation, Nantes, France, 18 Sep 1979. U.S. Sales Only.

The present work concentrates on the radioprotection aspect in the use of a Siemens triomat type

X-ray generator for lung radiography. A first set of measurements of the absorbed dose received by patients undergoing lung X-ray examinations was used to compare the values observed during radiographic operations and when standard plates are obtained. The absorbed dose received for the radiophotographs seemed too high, so the various working parameters were reviewed; the new measurements carried out showed a factor 10 gain on the absorbed dose for a 'standard' 70 kg man, the quality of the image remaining acceptable. This report gives the results of all the measurements performed. The doses received with standard plates remain the lowest. Experience acquired at the time of these measurements brings out the absolute necessity for a periodic check on the accuracy of the parameters displayed on the X-ray generator control panels. (Atomindex citation 11:525431)

CONF-800731-3 PC **A02**/MF **A01**
Georgia Inst. of Tech., Atlanta. School of Nuclear Engineering.
Measurement of Neutron and Charged Particle Contamination in High Energy Medical Therapy X-Ray BEAMS Using Recoil Track Registration in Polycarbonate Foils.
M. E. Sanders, K. Z. Morgan, and P. H. McGinley. 1980, 16p
Contract AS05-76EV04814
Health Physics Society meeting, Seattle, WA, USA, 20 Jul 1980.

The production of photoneutrons and high-energy charged particles by betatrons and linear accelerators used in radiotherapy is measured. It is concluded there exists sufficient contamination in high-energy x-ray beams to be a consideration in certain radiotherapy situations. (ERA citation 05:035506)

FRNC-TH-801 PC **A07**/MF **A01**
Bordeaux-2 Univ. (France).
Technetium 99M Pyrophosphate Bone Scintigraphy in the Exploration of Breast Cancer Bone Metastases (Analysis of 311 Examinations).
These (D. Med.),
F. Bonichon. 1976, 131p
In French.
U.S. Sales Only.

Sodium pyrophosphate was chosen for its ease of application and the quality of the images it gives. The aim of this study, in the context of breast cancer exploration, is to examine: - its reliability for the detection of bone metastases, - the correlation of its results with other factors. The first part reviews the properties of sup(99m)Tc-labelled sodium pyrophosphate and the current hypotheses on the mechanism of its bone fixation, essential for an understanding of the image formation mechanism and for the interpretation of anomalies. Part two gives an analysis of 311 examinations carried out on 223 patients, obtained by the use of a coded file and modern data processing methods. The following are dealt with in turn: - material and methods, - the results themselves and especially their reliability for the whole skeleton and for one bone at a time, - discussion and comparison with published data. Sup(99m)Tc pyrophosphate bone scintigraphy is a simple examination easy to interpret and allows the whole skeleton to be explored. Abnormal scintigraphic images are: - seldom hypofixing lacunae, - usually 'hyperfixing centres' which point to a perilesional bone reaction and depend on: vascular factors, the affinity of technetium for the immature collagen fibres of the forming bone matrix, the affinity of pyrophosphate for the bone mineral substance. (Atomindex citation 11:517694)

FRNC-TH-834 PC **A06**/MF **A01**
Paris-6 Univ. (France).
Assessment of Skeleton Scintigraphic Study in Breast Cancer Patients (Relative to 322 Observations).
These (D. Med.),
N. Liechtmaneger. 1976, 104p
In French.
U.S. Sales Only.

The results of scintigraphic whole-skeleton examinations have recently been improved by the use of sup(99m)Tc labelled phosphorus compounds. An assessment was made of 368 explorations, most of which were carried out with pyrophosphates and a few, the most recent, with ethane hydroxy diphosphonate, both labelled with sup(99m)Tc. For pyrophosphates a 10 mCi intraveinous injection is followed by a latency time of about 3 hours before the scintigraphic examination. In the case of diphosphonates, which have only been used lately and on relatively few cases, the same 10 mCi intravenous injection is administered but the latency time before the examination is only half as long, i.e. about 1h30 min, which is a definite advantage. However the number of examinations carried out with the latter is too small to afford a significant comparison between the two products. The main object of this work is to count the hyperfixation centres and to estimate their specificity and their coexistence or otherwise with clinical or radiological signs. (Atomindex citation 11:517722)

HRP-0301401/6 PC **A16**/MF **A01**
Bureau of Health Planning, Hyattsville, MD.
Cost Containment and Health Planning: A Bibliography.
Jul 80, 374p DHHS/PUB/HRA-80-14011, BHP/HPBS-14

Citations were selected from the computerized data base of the National Health Planning Information Center and the MEDLARS of the National Library of Medicine and from a manual search of library materials relevant to containing costs in health planning and health care delivery. The Contents pages list the 13 sections into which the bibliography is divided and the subjects which are included under each of these sections. For example, Section III. - Identifying and Reducing Excess Facilities and Services--contains 20 citations, 18 of which are annotated, and include references to appropriateness review, licensure, conversion/closure, consolidation and mergers, shared services, regionalization, certification, and technology assessment. Section VII. - Fostering Geographically and Service Integrated Health Care Delivery--has 20 annotated references on multi-hospital systems, satellite facilities, regionalization of facilities, community mental health centers, special area needs, etc. Sources of document availability or publisher are included.

HRP-0902388/8 PC **A05**/MF **A01**
Applied Management Sciences, Inc., Silver Spring, MD.
Productivity and Health - Hospital Productivity - A Synopsis of the Literature.
Aug 80, 95p DHHS/PUB/HRA-80-14028
Contract PHS-HRA-233-79-3001

The volume focuses on the state-of-the-art in hospital productivity measurement and the uses of productivity measures for health policymakers and planners. Productivity measures can be implemented on performance monitors in formulating health system goals, evaluating proposed new hospital facilities or services for certificate-of-need approval, in cost analysis of approved and operational capital projects, in appropriateness review activities, and in the education of HSA staff and governing board members about the potential impact of using resources in a specific way. Before implementing a hospital productivity measurement effort, however, health planning agencies should consider implications of the following: costliness, relevancy, conceptual clarity, political balance, adaptability, and potential for interaction with other regulatory agency and public planning bodies. Studies of hospital productivity may be classified into two broad categories: (1) economic analyses, concentrating on relationships between overall inputs and outputs measured over a given time period; and (2) engineering and administrative science, involving analysis of a particular work process to assess performance and often to redesign the process. Hospital productivity measures are reviewed, discussed, and arrayed in tables at three levels of analysis: systemwide, institutional, and departmental. For health planners the conceptual model described at the systemwide level is the most applicable for measuring the impact of hospital output on the health status of the population served by the regional hospital system. Within this framework both the appropriateness of the hospital care offered and available and the level of satisfaction of the regional population with the quality, quantity, and appropriateness of hospital are considered. For further study of hospital productivity, literature references are included, as well as selected data bases and productivity monitoring systems.

HRP-0902389/6 PC **A08**/MF **A01**
Medicus Systems Corp., Washington, DC.
Productivity and Health - A Review and Evaluation of Health Personnel Productivity.
Aug 80, 171p DHHS/PUB/HRA-80-14029
Contract PHS-HRA-231-77-0121

Health manpower productivity is defined as the quantity of health services delivered per unit of input, taking the quality of services into account. For the purpose of this study, the following eight health manpower professions were selected: physician extenders, podiatrists, optometrists, pharmacists, and allied health personnel. With each of these professions as a separate section of this monograph, consideration is given to measures of productivity, supply and distribution changes, factors affecting productivity, and possibilities for productivity change, as they relate to the specific profession. Recommendations for policy options to enhance health manpower productivity can be classified into areas of economics, planning and regulation, education, organization, professionalism, and consumerism. Some of the economic recommendations include disclosures of prices of medical care under legislation, development of incentive payments for productivity promotion, equal percentage margin for services, direct third party payment of physician assistants and nurse practitioners as in the Rural Health Clinic Services Act to provide incentives for practice in underserved areas, and reimbursement incentives for primary care practitioners at the same rates as other specialists for the same services. (Comparable recommendations are listed for planning and regulation, education, etc.) General references are included, as well as references under the specific health manpower categories.

HRP-0902411/8 PC **A04**/MF **A01**
Florida Gulf Health Systems Agency, Inc., St. Petersburg.
Annual Implementation Plan for 1980. Health Service Area 4 Florida.
1980, 66p
Grant PHS-04-P-000226-04-1
See also report dated 1979, HRP-0901715 and HRP-0902412.

The 1980 Annual Implementation Plan (AIP) is a one-year action plan made up of a group of proposed short-term change activities to meet the long-term goals for the health status and health care system established by this community. Included in the AIP are objectives and action plans which continue efforts begun in previous years, as well as new initiatives developed out of evaluation of the past year's total planning effort.

HRP-0902483/7 PC **A03**/MF **A01**
West Michigan Health Systems Agency, Grand Rapids.
Study of the Supply of Physical Therapists in West Central Michigan.
May 80, 30p STUDY-80-8
Sponsored in part by Bureau of Health Planning, Hyattsville, MD.

A shortage of physical therapists exists in west central Michigan. Other results of the 1978 study show that a maldistribution of therapists exists; 99 percent are white and 68.6 percent, female; and none are from ethnic minorities. An increase in the number trained in existing education institutions in eastern Michigan is expected to have little impact on the supply on the western region because of the demand across the state. Recommendations are to increase the supply and improve the distribution of personnel by encouraging the establishment (with coordinated efforts of area colleges) of an educational program within the western region and by emphasizing recruitment of ethnic minorities. Findings were derived from assessments of two areas: (1) demand factors such as industry growth, increase in rehabilitation services, legislation changes, and consumer demands and (2) supply factors relating to historical trends, supply projections, and educational training expansion. Demand factor analysis showed that rehabilitative services can expect an increased demand due to

technological development within the health care industry, increased patient load, legislation on rehabilitation programs for the handicapped, and consumer interest in prevention. Supply factor analysis showed that current supply is insufficient to meet demands, based on data relating to projected annual job openings and budgeted vacancies. Tables and bibliography are included.

HRP-0902539/6 PC **A04**/MF **A01**
North Central Georgia Health Systems Agency, Inc., Atlanta.
A Long-Term Care Model for Area III,
William J. Neugroschel. Jul 80, 58p
Grant PHS-HSA-04-P-000219-04

This theoretical model for a long-term system, from which specific area-wide plans can be developed, contains 19 services and programs. These services and programs should enable families to maintain their caretaker roles and play an important part in the planning of an individual's care. The model provides for a continuum of services in multiple settings in the least restrictive setting possible; easy access to the system through multiple intake points; formal linkages to other parallel service systems; professional multimodal assessment of a client's functional capabilities; case management services; a uniform management data base; a single administrative unit to coordinate the system and the movement of clients from one level/type of care to aother as their needs change. The following definition of long-term care services provides groundwork for the model: Preventive, diagnostic, therapeutic, rehabilitative, supportive, and maintenance services provided on a recurring or continuous basis to individuals of all age groups who have chronic, physical, and/or mental impairments. A bibliography is included.

HRP-0902541/2 PC **A05**/MF **A01**
Comprehensive Health Planning Council of Southeastern Michigan, Inc., Detroit.
Criteria and Standards for Health Maintenance Organizations in Southeastern Michigan.
26 Mar 80, 84p
Grant PHS-HRA-05-P-000235-04
See also HRP-0902542.

The criteria and standards pertain to the planning, development, qualification, operation, expansion, and dissolution of health maintenance organizations (HMOs). The criteria and standards are divided into four sections and further subdivided by health systems characteristics: Section 1, review of application for certificate of authority to plan and develop an HMO and review of letters of intent to apply for licensure (2 criteria, 4 standards); Section 2, review of applications for licensure: demonstrated community need (6, 14), ability to staff and operate (2, 4), physical design (2, 1), quality of care (1, 4), financial issues (3, 5), economic issues (3, 7); Section 3, review of applications for grants, loans, or loan extension: demonstrated community need (3, 7), ability to staff and operate (1, 4), physical design (1, 3), quality of care (1, 4), financial issues (1, 3), economic issues (1, 0), other organizational issues (1, 4); Section 4, review of certificate of need applications: demonstrated community need (3, 10), ability to staff and operate (2, 2), physical design (2, 8), quality of care (1, 1), financial issues (1, 1), economic issues (1, 1), other organizational issues (1, 3). Brief explanations of rationale accompany some statements. There is no bibliography of sources although acknowledgement is given to community participants. Appendices contain a glossary and excerpts from Federal and state laws and regulations. Map, chart.

HRP-0902544/6 PC **A03**/MF **A01**
Palmetto-Lowcountry Health Systems Agency, Inc., Summerville, SC.
Computed Tomography Services.
19 May 80, 40p
Sponsored in part by Bureau of Health Planning, Hyattsville, MD.

This discussion of computed tomography (CT) scanners provides a definition of the service, a brief history of the technological development, an overview of the possible uses, and Federal standards and guidelines including excerpts from the National Guidelines for Health Planning. The criteria and standards for certificate of need review are preceded by a discussion of each of the six categories. The discussions present a rationale for the development of the criteria and standards for each category. The criteria and standards for three categories--quality, acceptability, and continuity--are deferred to the full accreditation standards of the Joint Commission of Accreditation of Hospitals or to meeting certification and/or licensure requirements. Availability has 3 criteria, 5 standards; accessibility, 6 criteria, 11 standards; and cost, 2 criteria, 2 standards. The majority of the standards are quantifiable. No list of sources is given although reference is made to pertinent Federal and state legislation and requirements. Appendices include clinical conditions for which CT is efficacious, principles of utilization, excerpts from the Federal Register, and a glossary of related terms.

HRP-0902545/3 PC **A03**/MF **A01**
West Michigan Health Systems Agency, Grand Rapids.
Action Plan for Health Promotion in the Workplace.
May 80, 47p STUDY-80-9
Sponsored in part by Bureau of Health Planning, Hyattsville, MD.

A study was done on the various health promotion programs established through workplaces outside the local area, and their basic components are discussed. In addition to the study, a survey that considered the interest in, and the development of, health promotion programs was mailed out to 64 randomly selected employers in a three county area, plus eight other major local employers not included in the selection; response rate was 34 percent. The survey indicates that larger employers are more likely to be interested and involved in health promotion programs and that the predominant health-related services sponsored by employers are oriented more toward disease treatment than health promotion. It is concluded that health promotion programs are a viable way to control health-related costs. There is interest in these programs among local businesses and labor members, and efforts to start programs have already begun. The voluntary nature of these programs is of key importance; they are most successfully organized through a cooperative effort between company managers and the target participant groups. The overall success of establishing services in the area will depend heavily on how well existing resources can be brought together to help support these programs. Specific recommendations for continued agency support of heath promotion are outlined. Presented is a bibliography, appendices which include the survey instrument, a list of respondents, and health appraisal samples.

HRP-0902546/1 PC **A03**/MF **A01**
Appalachian Georgia Health Systems Agency, Inc., Cartersville.
Availability of School Health Education in the Appalachian Georgia Health Service Area.
12 Jun 80, 45p
Sponsored in part by Bureau of Health Planning, Hyattsville, MD.

The results of the survey indicate that school-based health education, specifically family life education courses, are available and accessible to a relatively small percentage of the Appalachian Georgia health service area's student population and that health education programs suffer from low, although increasing, visability; a narrow definition of the content of health education; and a shortage of adequately trained teachers. The methodology included the following: (1) a literature search, (2) an assessment of problems encountered by other agencies which have carried out similar surveys, (3) the identification and interviewing of principal state and local health education officials, (4) the selection and administration of a survey instrument, and (5) an evaluation of the survey. The survey used four indicators to determine the level of sophistication of a school's program: (1) administration of health education programs, (2) evaluation of certified health education personnel, (3) physical facilities and instructional aide available, and (4) curriculum planning and content. No attempt was made to evaluate programs for effectiveness or appropriateness of content. Recommendations included such things as giving health education higher priority as a basic part of the curriculum, providing inservice training to all teachers, establishing a network of shared resources, and developing materials sequential in scope. Appendices include a sample of the survey.

HRP-0902547/9 PC **A03**/MF **A01**
Indiana State Board of Health, Indianapolis.
Disease Incidence Management Model for, and a Current Inventory of Radiation Oncology Facilities and Services in Indiana.
1980, 31p
Sponsored in part by Bureau of Health Planning, Hyattsville, MD.

To project radiation oncology patient volume and facility capacity, a need-based methodology has been applied to 1978 data for Indiana patients and facilities. Overall used is the product of cancer incidence (as adjusted for new and old patients seeking care) and average number of treatments per patient. Service capability is the sum of annual treatment capacities of existing units. Service capability is subtracted from overall need to derive unmet need. Twenty-two assumptions are delineated pertaining to incidence, patients seeking care, mortality and survival, initial and repeated use of radiation therapy, treatment intent (curative vs. palliative), treatment per patient, and equipment capabilities and utilization. The model assumes that the net service population is a more accurate factor than the general population; that evaluation of need should be on an areawide basis; that the American Cancer Society's estimates for incidence and survival rates will be valid in 1984; and that the treatment capability of the equipment will have an 80 percent utilization rate. An inventory of radiation facilities in Indiana lists organizations, locations, and available equipment. The appendix is a glossary.

HRP-0902548/7 PC **A06**/MF **A01**
GLS Health Systems, Inc., Flint, MI.
Plan for Hospital Bed Capacity, 1980-1984. Volume I.
Apr 80, 102p
Grant DHEW-05-P-000246-04-2

This plan describes a strategy to reduce 367 excess hospital beds in the Flint, Michigan, service area during a five-year period. Hospitals are defined as being 'consistent' or 'inconsistent' with the performance measures (standards) of key criteria selected from Guidelines for Identifying the Appropriate Hospital Bed Capacity and Criteria for Review and Approval of Health Systems Agency Plans for Reduction of Hospital Beds (Michigan Department of Public Health, May, 1979). The criteria and performance measures for each guideline include: quality of care (4 criteria, 5 performance measures); size, scope, and utilization of services (2, 8); medical staff (2, 3); institutional planning and coordination (2, 3); and financial performance (4, 4). The bed reduction methodology makes four assumptions: (a) each hospital's market share remains constant; (b) pediatric/adult ratio remains constant; (c) patient days will decrease; and (d) average occupancy rate is 89 percent for adult and 75 percent for pediatric medical/surgical services. The bed reduction formula derives the expected adult and pediatric medical/surgical patient days by inflating the current patient days 3 percent. Each expected average daily census is divided by the appropriate occupancy standard resulting in beds needed. The sum of the adult and pediatric beds needed is subtracted from existing beds. Other considerations in the bed reduction plan are the reduction of utilization, the effects of the plan on the health care system, and the potential barriers to plan implementation.

HRP-0902550/3 PC **A02**/MF **A01**
West Michigan Health Systems Agency, Grand Rapids.
Mental Health Primary Prevention for Children: A Study of the Literature.
Jun 80, 23p STUDY-80-15
Sponsored in part by Bureau of Health Planning, Hyattsville, MD.

Researchers who study early identification and prevention of mental disorders estimate that by the time children reach the early elementary grades, one in three will show signs of disfunction, ranging from moderate to severe. A review of literature on child-oriented prevention programs is presented, along with information from interviews with professicnals in the field, in order to devise a theoretical

framework from which to approach mental health prevention, especially the emerging necessary activity of primary prevention needs to be handled by a variety of approaches. Programs in health care settings stress the mother-infant relationships and the special problems of adolescents. Promoting healthy child-adult relationships through role-modeling is the key to prevention in the family setting. Programs in the school setting prepare the teacher to act as a facilitator for the promotion of sound mental health among children. Due to a multitude of barriers including public assistance, low status of prevention professionals, and difficulty in providing effectiveness of the programming, community mental health agencies have traditionally avoided primary prevention programming for children.

HRP-0902551/1 PC **A02**/MF **A01**
Western Center for Health Planning, San Francisco, CA.
The Integration of Health Systems Plans into the State Health Plan,
Ted Bogue, and Paul Justison. 22 Aug 80, 13p
TECHNICAL ASSISTANCE MEMO-51
Contract PHS-HRA-232-79-0037

The health systems plans (HSPs) of a state's Health Systems Agencies (HSAs) must be integrated into the state health plan (SHP). State health planning and development agency decisions on certificate of need applications are based on the SHP and must consistent for similarly situated applicance to withstand legal challenges. Such challenges might best be avoided by reconciling variations in HSPs before they are integrated into the SHP. Since quantitative goals, objectives, and resource standards will vary for different HSAs, the state can reconcile these variations: (1) by establishing resource standards for HSA use and requiring HSAs to justify any variation from these standards; (2) by establishing uniform procedures for HSA use in determining service needs; or (3) by evaluating each individual resource statement developed by HSAs. The integration of the reconciled HSPs into the SHP should include, at a minimum, resource levels, goals and objectives, and when appropriate, specific recommended actions. The appendix discusses several court cases which have dealt with consistency in agency decisions and reemphasizes that HSAs must objectively justify any variations from established state guidelines.

HRP-0902566/9 PC **A11**/MF **A01**
Urban Systems Research and Engineering, Inc., Cambridge, MA.
An Assessment of Admissions Criteria for Bilingual/Bicultural Applicants to Health Professions Schools.
Nov 77, 241p DHEW/PUB/HRA-80-11
Contract PHS-HRA-230-76-0256

Bilingual and bicultural applicants to health professions schools -- Hispanics, Native Americans, and Asian-Americans -- are often at a disadvantage in dealing with interviews and entrance examinations because of communications and language difficulties and because of the ethnocentric orientation of the institutions. These problems contribute to the low rate of admissions for these students and ultimately to the small numbers of bilingual/bicultural practitioners in the health professions. The report identifies barriers faced by bilingual/bicultural students as they compete for admission and provides observations and insights that we hope will aid educational policy makers, admissions personnel, and faculty in finding solutions.

HRP-0902567/7 PC **A10**/MF **A01**
Urban Systems Research and Engineering, Inc., Cambridge, MA.
An Assessment of Bilingual/Bicultural Awareness Activities in Health Professions Schools.
Nov 77, 225p DHEW/PUB/HRA-80-10
Contract PHS-230-76-0257

Health care workers are becoming increasingly sensitive to the special needs of bilingual and bicultural groups and the particular obstacles they face in securing adequate health services. Language and cultural differences within Hispanic, Native American, and Asian populations, combined with increased costs of care, frequent economic difficulties, and the ethnocentric attitudes of some health care workers, are problems calling for systematic identification and remedial action. In recognition of these problems, the Health Professions Educational Assistance Act of 1976 (P.L. 94-484) required studies concerning the adequacy of education for those health practitioners who serve populations of limited English-speaking ability, and of the effectiveness (and potential for cultural bias) of the admissions examinations used by health professions schools to evaluate students from such backgrounds. This report, addresses the first of these questions.

HRP-0902571/9 PC **A02**/MF **A01**
National Conference of State Legislatures, Denver, CO.
Hospital Case Mix Reimbursement: The New Jersey Diagnostic Related Groups Experiment.
Sep 80, 9p
Grants PHS-18-P-97321/3-01, PHS-18-P-97062/8-01

To provide incentives for controlling costs, the New Jersey Department of Health has developed a system for reimbursing hospitals based on the various diagnoses of patients within the hospital, or the 'case mix.' Analysis of patient discharge abstracts yielded 383 Diagnostic Related Groups (DRGs). Rates of payment are calculated for each hospital. The basic rate is composed of an approved direct cost for each DRG (based on each hospital's own average DRG and an adjusted statewide average) and a percentage markup for indirect costs. These costs are then adjusted for inflation, payor differentials for practices which benefit the health care system as a whole, an uncompensated care factor, and (if applicable) a prompt payment discount. The Department of Health issues to each hospital a schedule of rates, which may be appealed in whole or in part. Advantages of the system include: (1) recognition of differences among hospitals; (2) use of positive cost containment incentives; and (3) provision of additional management tools to administrators. Negative criticisms include: (1) complexity of the system; (2) lack of analysis before implementation; (3) inability to adjust for varying service utilization patterns of patients covered by different payors; and (4) impact on uninsured patients.

HRP-0902572/7 PC **A03**/MF **A01**
Southeastern Wisconsin Health Systems Agency, Inc., Milwaukee.
Criteria and Standards for End-Stage Renal Disease Services (Kidney Transplantation and Chronic Kidney Dialysis) in Southeastern Wisconsin.
Aug 80, 36p
Sponsored in part by Bureau of Health Planning, Hyattsville, MD.

Service description, criteria and standards, and information requirements are presented for use in the development of the end-stage renal disease (ESRD) service section of the health systems plan. The plan development process incorporates the appropriateness review function. Both kidney transplantation and chronic renal dialysis services are described in terms of their availability, accessibility, cost, quality, and continuity. Federal, state, and agency policies are delineated, as are the 14 general considerations in the appropriateness review regulations. The service description sections of the document, which include some bibliographic references, provide the basis for the separately presented criteria and standards. Four system characteristics are assessed for new and existing ESRD services: availability (4 criteria, 10 standards), accessibility (1, 1), cost (2, 2), and quality (6, 6). Although information requirements are specified, special data collection will not be necessary since the information can be extracted from specified documents. The appendix reprints Federal regulations regarding the classification of ESRD facilities.

HRP-0902579/2 PC **A06**/MF **A01**
Alpha Center for Health Planning, Bethesda, MD.
Literature Review and Bibliography on Coordination of Mental Health Planning with Health Systems Planning.
15 Sep 80, 104p
Contracts PHS-HRA-232-79-0090, PHS-HRA-232-79-0035
Portions of this document are not fully legible.

The attached monograph is an up-dated version of an earlier Alpha Center bibliography (distributed in December 1979) on health and mental health coordination. This bibliography includes 87 annotated references and was developed as a component of a larger study on coordination between planning agencies and mental health authorities. This bibliography differs from existing reference documents in that it focuses on the problems and potentials of coordination between these two systems. Included are both academic papers on coordination as a process and case-studies describing the real problems which have been encountered in attempts at coordination. The intent is for this monograph to aid planners as they continue to establish working relationship with the mental health community.

HRP-0902583/4 PC **A02**/MF **A01**
Ohio State Univ. Research Foundation, Columbus.
Nutritional Care Independent Study Packages for Family Practice Residents.
Executive summary (Final) 1 Oct 78-29 Jun 80,
Tennyson Williams, and Lawrence L. Gabel. Sep 80, 12p
Contract PHS-HRA-232-78-0194

The sophistication of nutrition education might be questioned in that residency faculty often have limited expertise in nutritional care at the application levels. Questions have been raised about physicians' abilities to counsel and treat patients with nutritional, or nutritionally related, problems. For this reason, the primary purpose of this project was to design, develop, and refine independent study packages the content of which would enhance the expertise of physicians in primary care to provide their patients with sound, nutritional care.

INIS-mf-5584 PC **A05**/MF **A01**
Bonn Univ. (Germany, F.R.). Mathematisch-Naturwissenschaftliche Fakultaet.
Radioiodine Labeling of Tyramin Derivatives of Some Digitalis Glycosides and Their Aglyka for the Scintiscanning of the Adrenal Glands.
Diss. (D.Sc.),
P. H. Focken. 1978, 100p
In German.
U.S. Sales Only.

The first part of the present work deals with the synthesis and radio-iodination of tyramine derivatives of digitoxigenin, digoxigenin, gitoxigenin and their glycosides. In the second part, animal experiments on rats and dogs for organ-specific enrichment of the synthesized compounds are described. The regioselective reductive amination of cardenolide ketones and glycoside dialdehydes with tyramin is successful with sodium cyanoboron hydride as reducing agent. Monotyraminyl genins are produced from the aglyka whilst glycosides convert to mono- and dityraminyl glycosides. A known radio-iodination method is modified to meet the requirements of the present problem. The radio-iodination is carried out with the nuclides exp 123 I, exp 125 I and exp 131 I. Scintiscanning of the adrenal glands of rats and dogs is possible within a few hours with exp 131 I-3-tyraminyl-3-desoxi-digitoxigenin. (Atomindex citation 11:517704)

INKA-Conf-79-219-014 PC **A02**/MF **A01**
Umea Univ. (Sweden). Kemiska Institutionen.
What Does the Psychiatrist Expect of Computed Tomography.
G. Huber. 1979, 13p CONF-7905136-8
In German.15. annual meeting of the Deutsche Gesellschaft fuer Neuroradiology e.V. Mannheim, F.R. Germany, 10 May 1979.
U.S. Sales Only.

In the author's opinion computed tomography should be applied as an instrument of basic research also in psychiatry. The problem of standardisation is, for the time being, not yet sufficiently solved. Wrong judgements on the cerebral cortex resulting from wrongly positive findings occur frequently. For re-handling the topic 'brain atrophy and psychosyndrome', which is important for clinical psychiatry, the CT-results should be compared with the findings obtained in the preceding systematical pneumoencephalographical-clinical correlation examinations. The excellent possibilities provided by the new method for practical diagnostics

and research must be utilized with critical appreciation of the experience gained until now. If groups of examining of capacities closely co-operate over a long-term period, there may be some chances to bring some questions still open and unresolved closer to their solution and, maybe, even to finish the scientific handling of the complex of questions on 'brain atrophic and psychopathological finding' with radiological-morphological methods. (Atomindex citation 11:517676)

N81-10695/7 PC **A03**/MF **A01**
European Space Agency, Paris (France).
A Method for Semi-Automatic Analysis of Eye Movements.
H. Radke. Jun 80, 28p ESA-TT-475, DFVLR-MITT-79-02
Transl. into English of "Ein Verfahren Zur Teilautomatisierten Auswertung von Blickbewegungsmessungen" Rept. Dfvlr-Mitt-79-02 Dfvlr, Brunswick, Dec. 1978. Original Report in German Previously Announced as N80-23005.

The measurement and analysis of the operator's visual behavior is described in terms of its importance as a tool for human factor research on the layout of displays and controls. However, the analysis of eye point of regard data is difficult and time consuming. A semiautomatic computer aided procedure is described, which reduces the time needed for data analysis.

PB80-929416 PC**$4.50**/MF**$3.00**
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Diagnosis and Treatment of Cancer of the Lower Respiratory Tract.
Special listing.
18 Nov 80, 27p NCI/ICRDB/SL-418
Supersedes NTISUB/E/294-022.

The Special Listing of Current Cancer Research Projects is a publication of the International Cancer Research Data Bank (ICRDB) Program of the National Cancer Institute. Each Listing contains descriptions of ongoing projects in one selected cancer research area. The research areas include: Screening, diagnosis, and prognosis; Therapy; Broad programs and cooperative groups.

PB80-929613 PC**$4.50**/MF**$3.00**
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Nitroso Compounds.
Special listing.
25 Nov 80, 32p NCI/ICRDB/SL-414
Supersedes NTISUB/E/296-016.

This Special Listing of Current Cancer Research Projects is a publication of the International Cancer Research Data Bank (ICRDB) Program of the National Cancer Institute. Each Listing contains descriptions of ongoing projects in one selected cancer research area. The research areas include: Effect of nitroso compounds on nucleic acids; Other biochemical and immunological effects of nitroso compounds; Metabolism and pharmacology of nitroso compounds; Cell transformation by nitroso compounds and related in vitro studies; Studies of specific types of cancers induced by nitroso compounds; Effects of radiation, drugs, diet, and other factors on carcinogenesis by nitroso compounds; Other in vivo studies of carcinogenesis by nitroso compounds; Nitroso compounds in the environment; Chemistry, synthesis, and reactions of nitroso compounds; Analytical methods for nitroso compounds.

PB81-112260
(Order as PB81-112211, PC **A05**/MF **A01**)
Suzhou Medical Coll. (China). First Teaching Hospital.
Cellulose Acetate Electrophoresis of Cerebrospinal Fluid Proteins with Normal Values of 135 Persons.
Mar 80, 4p
Included in Chinese Medical Jnl., v93 n3 p169-172 1980.

A study on cellulose acetate electrophoresis of cerebrospinal fluid (CSF) proteins is reported. Two methods are used for concentration, acetone precipitation and sephadex dialysis with slight modifications. They are both considered to be clinically valuable, but the former is simpler and more practical. The normal values of 135 persons are presented.

PB81-112336
(Order as PB81-112211, PC **A05**/MF **A01**)
Chinese Medical Association, Beijing.
Chinese Medical Literature.
Mar 80, 3p
Included in Chinese Medical Jnl., v93 n3 p201-203 1980.

Contents:
- Rare human parasitic diseases and infections in China;
- Treatment of hypertension with Qugong exercise. 4 Year comparison of therapeutic effects in 135 cases;
- Clinical observations on 40 cases of epidemic hemorrhagic fever shock treated mainly by balanced salt solution;
- Combined intravenous anesthesia with sodium hydroxybutyrate for intracardiac operations under extracorporeal circulation. Clinical observations on 100 cases;
- Clinical observations on 156 cases of salmonella typhimurium infection;
- Determination of partition coefficient by high-pressure liquid chromatography (I) Determination of partition coefficient of cinnamic acids and related compounds by reversed-phase high-pressure liquid chromatography;
- Immunoenzymic method and immunoautoradiographic method for mass survey of nasopharyngeal carcinoma (NPC);
- Isolation and identification of acute hemorrhagic conjunctivitis virus in Shanghai.

PB81-114795 PC **A08**/MF **A01**
Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek, The Hague (Netherlands).
Quantitative Electroencephalography in Cerebral Ischemia. Data Processing EEG Activity, Both Spontaneous and During Photic Stimulation. A Controlled Clinical Study in Patients with Acute Unilateral Cerebral Ischemia,
A. C. Van Huffelen, D. C. J. Poortvliet, and C. J. M. Van Der Wulp. 1979, 161p

The study investigates the possibility of improving the clinical significance of the EEG by signal analysis and quantification. A selected group of patients with acute unilateral cerebral ischemia was chosen for this study. These patients can be regarded as more or less representative of the much larger category of patients with functional disorders caused by inadequate cerebral blood flow. Functional disorders in such cases are chiefly expressed in the EEG by the occurrence of less fast and more slow activity. By restricting the investigation to a small selected homogeneous group of patients it was expected that conclusions pertinent to such a group could be reached more easily. A disadvantage is that the question remains unanswered whether the conclusions drawn are valid for other groups of patients. Patients with acute unilateral ischemia were selected, because this condition is important for both clinical and electroencephalographic reasons.

PB81-116287 PC **A05**/MF **A01**
Chinese Medical Association, Beijing.
Chinese Medical Journal. Volume 93, Number 4, April 1980.
Apr 80, 82p
See also PB81-112211.

No abstract available.

PB81-116295
(Order as PB81-116287, PC **A05**/MF **A01**)
Shanghai First Medical Coll. (China). Huashan Hospital.
The Laboratory and Clinical Studies of Sulfonamides,
Wang Fu, Zhang Meifang, Zhang Jingde, Zhang Zhilin, and Gu Yaming. Apr 80, 10p
Included in Chinese Medical Jnl., v93 n4 p207-216 1980.

This paper reports the results of antibacterial, pharmacologic and clinical studies on the sulfonamides, trimethoprim (TMP) and sulfonamide-TMP combination manufactured in China. Bacterial sensitivity tests of these drugs were carried out on 3,549 strains of pathogens, belonging to 18 bacterial species, isolated clinically. When combined with TMP, the antibacterial activities of the sulfonamides were greatly enhanced particularly on Staph, aureus, E. coli, Enterobacter aerogenes and proteus spp, which were approximately similar to those of kanamycin or gentamycin. Under similar conditions the blood and urine concentrations of 7 different kinds of sulfonamides and TMP administered orally, intramuscularly, and intravenously were determined in a group of healthy volunteers.

PB81-116303
(Order as PB81-116287, PC **A05**/MF **A01**)
Chinese Academy of Medical Sciences, Beijing. Inst. of Materia Medica.
Ethyl 4(5)-Imidazolecarboxylate (Code No. C751) as an Orally Effective Chemotherapeutic Agent Against Leptospirosis.
Apr 80, 6p
Prepared in cooperation with Hunan Inst. of Pharmaceutical Industries (China).
Included in Chinese Medical Jnl., v93 n4 p217-226 1980.

938 compounds were tested against experimental leptospirosis on hamsters in a joint screening program launched between 1969-1973. Attention was later focussed on imidazole derivatives from which compounds with the basic structure as depicted in the formula where R=H, OH, OAlkyl, or NH2 were found to be active. The structure-activity relationship (SAR) was discussed. Ethyl 4(5)-imidazolecarboxylate (Code No. C-751) was selected for further studies in experimental therapy, it was shown to be highly effective in protecting from death golden hamsters challenge with lethal doses, of L. icterohaemorrhagtae Lai strain and L. canicola. However, its action was essentially inhibitive in nature.

PB81-116311
(Order as PB81-116287, PC **A05**/MF **A01**)
Tianjin People's Hospital (China). Breast Service.
Results in 90 Cases of Breast Cancer (5 Year) Following Combined Treatment with Colchicine Derivatives, Mastectomy and Postoperative Radiotherapy.
Apr 80, 4p
Included in Chinese Medical Jnl., v93 n4 p227-230 1980.

90 cases of breast cancer, 25 Stage I, 29 Stage II and 36 Stage III, were treated with preoperative colchicine preparations (extracted from the Chinese medicinal herb Iphigenia indica A Grey, mastectomy and postoperative irradiation. 54 (60%) had axillary lymphnode metastases. All except 1 patient were followed up for 5 years postoperatively, 2 died of unknown causes. The overall survival rate was 66.6% (60/90), in those with and without axillary metastasis the survival rate was 51.8% (28/54) and 88.8% (32/36). The 5 year survival rate for Stage I patients was 96% (24/25), for Stage II 72.4% (21/29) and for Stage III 41.7% (15/36). The treatment failed in 27. The preoperative drug used was colchicine compound in 55 patients and synthetic colchicine amide in 35. The former was given at 2 mg iv. daily to totals of 20-100 mg (50-70 mg in 60%) with an objective response rate of 33.3% (complete regression and >50% tumor volume reduction). The latter was given at iv. 10-15 mg daily to totals of 100-600 mg (100-400 mg in 70%) with an objective response rate of 16.5% (complete regression and >50% tumor volume reduction).

PB81-116329
(Order as PB81-116287, PC **A05**/MF **A01**)
Beijing Obstetrics and Gynecology Hospital (China).
Clinical Analysis of 1,000 Cases of Cesarean Section Under Acupuncture Anesthesia.
Apr 80, 8p

Included in Chinese Medical Jnl., v93 n4 p231-238 1980.

1,000 cases of cesarean section under acupuncture anesthesia (AA) are presented, the success rate is 98.4% and the combined rate of Grades 1 and 2 is 75.8%. The clinical effects and conditions during and after operation are analyzed. Similar cases of cesarean section under epidural anesthesia during the same period are used for comparison. AA is a fairly good anesthetic method for cesarean section. It can be used in patients with pregnancy toxemia, anemia and other complications. Its advantages are stability of blood pressure and pulse during operation, less blood loss, rapid recovery after operation, safety, simplicity, lack of complications or anesthesia accidents.

PB81-116337
(Order as PB81-116287, PC **A05**/MF **A01**)
Chinese People's Liberation Army General Hospital, Beijing.
Correlation and Its Application in His Bundle Electrocardiograms,
Wang Xiangsheng. Apr 80, 12p
Included in Chinese Medical Jnl., v93 n4 p239-250 1980.

His bundle potential conducts to the body surface with a signal/noise (s/n) ratio equal to or lower than L. In all the published literature, it is stated that His bundle electrocardiogram (HBE) is shcwn by using the averaging method to make the s/n ratio larger than 1. In this paper, by correlation analysis, body-surface HBE is displayed in a special-purpose electronic computer. The correlation coefficients of the P-A, A-H, H-V intervals and the H-wave width measured by both methods are extremely large and can be substituted for each other. Compared with the averaging method, the s/n ratio of the correlation method is higher and there is little residual noise. Furthermore, it indicates the effect of integrating T time and delay time delta tau on the s/n ratio, the measuring resolution and the analytical time.

PB81-116345
(Order as PB81-116287, PC **A05**/MF **A01**)
Sichuan Medical Coll., Chengdu (China).
Cytogenetic Studies by Chromosome Banding Techniques on Peripheral Blood Cells from Nasopharyngeal Carcinoma Patients,
Zhang Sizhong, Qiu Jianchun, Gao Xiukun, Lin Daicheng, and Liu Yunghui. Apr 80, 9p
Included in Chinese Medical Jnl., v93 n4 p251-259 1980.

A chromosome analysis of cultured peripheral blood cells from 41 untreated patients with nasopharyngeal carcinoma (NPC) and 21 healthy controls was made by conventional and banding methods. It was found that both the numerical and structural aberration rates of the patient group were much higher than those of the control group. Most extra and missing chromosomes belonged to group C, and less to groups G, F and A. Furthermore, several kinds of abnormal chromosomes were observed in a few metaphases from some patients. Based on the data obtained, the genesis of some translocation chromosomes and the source as well as the implication of the aberrant cells are discussed. It is suggested that the increased aberration rates and the presence of some abnormal chromosomes might be a reflection of the general chromosome instability in NPC patients.

PB81-116352
(Order as PB81-116287, PC **A05**/MF **A01**)
Chinese Academy of Medical Sciences, Beijing. Capital Hospital.
Multiple Sclerosis, A Clinical Study of 70 Cases,
Zhao Baoxun, Liu Xiuqin, Guo Yupo, Yang Yinchang, and Huang Huifen. Apr 80, 5p
Included in Chinese Medical Jnl., v93 n4 p260-264 1980.

70 cases of multiple sclerosis were seen at the Department of Neurology of Capital Hospital in 1949-1977. There were 25 males and 45 females averaging of 30.6 years of age. The most frequent sites of the lesions based on the clinical symptomatology were the spinal cord and optic nerve, the cerebellum was much less frequently involved. The onset of the disease was acute or subacute in 63 cases. Remission and relapse were observed in 62 cases. There were 9 deaths. The survival times of these 9 cases after onset of illness was 1/4-4 years, 6 surviving less than 2 years. The clinical manifestations and pathologic findings noted in the present series support the opinion that optic neuromyelitis is but a variant of multiple sclerosis.

PB81-116360
(Order as PB81-116287, PC **A05**/MF **A01**)
Shanghai First Medical Coll. (China). Huashan Hospital.
Limb-Pain Epilepsy, Report of 9 Cases,
Qu Zhiping, Lu Chuanzhen, Yu Liyun, Chen Hanbai, and Ding Yue. Apr 80, 4p
Included in Chinese Medical Jnl., v93 n4 p265-268 1980.

9 cases of limb-pain epilepsy are presented. The characteristics of the disease are described.

PB81-116378
(Order as PB81-116287, PC **A05**/MF **A01**)
Lanzhou Medical Coll. (China).
Echinococcosis of the Central Nervous System,
Qiu Mingde, and Han Zhesheng. Apr 80, 6p
Included in Chinese Medical Jnl., v93 n4 p269-274 1980.

The authors report 6 cases of echinococcus cysts of the central nervous system including 1 case of septem pellucidum echinococcus cyst and 1 case of a cyst located in the anterior part of the third ventricle. Their clinical characteristics, EEG picture, angiographic and ventriculographic findings, diagnosis and surgical treatment are discussed.

PB81-116394
(Order as PB81-116287, PC **A05**/MF **A01**)
Shanghai Second Medical Coll. (China). Ruijin Hospital.
Successful Treatment of Sleep Apnea Syndrome by Transfusion of 'Vital Energy',
Zhu Songshan. Apr 80, 2p
Included in Chinese Medical Jnl., v93 n4 p279-280 1980.

A case of sleep apnea syndrome wwas successfully treated by transfusion of 'vital energy'. The donor was the patient's son, 20 years old and healthy. The machine used was type 701 electroacupuncture apparatus. Treatment was carried out by needling Zusanli unilaterally with the anode connected in the needle in the patient, and with the cathode to the needle in the donor. All symptoms and signs disappeared after 2 treatments.

PB81-116519 PC **A04**/MF **A01**
Chinese Medical Association, Beijing.
Chinese Medical Journal. Volume 93, Number 5, May 1980.
May 80, 73p
See also PB81-116287.

No abstract available.

PB81-116527
(Order as PB81-116519, PC **A04**/MF **A01**)
Beijing Tuberculosis Research Inst. (China). Dept. of Acupuncture Anesthesia.
Clinical Studies on Acupuncture Anesthesia in Lung Resection.
May 80, 6p
Included in Chinese Medical Jnl., v93 n5 p287-292 1980.

Acupuncture anesthesia (AA) in 1,048 cases of lung resection with a 97.2% success rate is analyzed for factors affecting efficiency of AA, such as acupuncture point selection and individual variations in mental activity type, attitude toward acupuncture, emotional state, sensitivity to acupuncture, tolerance of needling, physiologic parameters and ability to breath abdominally. Sex, age and occupation do not affect efficacy.

PB81-116535
(Order as PB81-116519, PC **A04**/MF **A01**)
Hanjiang Hospital, Putian (China). Surgical Dept.
Management of High-Lying Gastric Ulcers,
Chen Zhaoying, Lin Weihan, and Chen Qunying. May 80, 4p
Included in Chinese Medical Jnl., v93 n5 p293-296 1980.

Five methods for repairing defects after resection of high-lying gastric ulcers, have been devised. The results of 142 cases so treated have been satisfactory. Of 113 cases followed up for 1-9 years, over 90% have recovered without major complications. With the use of these methods of management, total gastrectomy or proximal partial gastrectomy can be dispensed with. The technics of the 5 procedures are described in detail.

PB81-116543
(Order as PB81-116519, PC **A04**/MF **A01**)
Iowa Univ., Iowa City.
Schistosomiasis Vaccination: Historical Development, Present Status and Future Prospects,
HF Hsu, SY Li Hsu, and LK Eveland. May 80, 16p
Included in Chinese Medical Jnl., v93 n5 p297-312 1980.

50 years of research on killed or live vaccine for schistosomiasis without successful production of a human schistosomiasis vaccine are reviewed.

PB81-116550
(Order as PB81-116519, PC **A04**/MF **A01**)
Qingdao Medical Coll. (China).
Observations on Corneal Endothelium,
Pan Zuoxin, Shi Zhenrong, and Sun Weirong. May 80, 3p
Included in Chinese Medical Jnl., v93 n5 p313-315 1980.

155 microscopic sections were studied for measuring the corneal endothelial cell density in different age groups. It was found that corneal endothelial cells decreased in number with age, the cell density dropped in the first 2 decades of life from 4,927 cells/sq mm to 3,341 cells/sq mm. Among cases of endothelialization of the anterior chamber the mean density, number of cells/sq mm, on the surface of the iris and on the posterior surface of diseased corneas was well below 30-40% for normal corneas. Both the cell bodies and their nuclei were flat and large. It was concluded that endothelialization of the anterior chamber is due to migration of endothelial cells from expansion and spreading of their whole population rather than to an increase in the number of cells.

PB81-116568
(Order as PB81-116519, PC **A04**/MF **A01**)
Shanghai Inst. of Traumatology and Orthopedics (China).
Effect of Cast Immobilization on Bone Turnover: A Tetracycline Double Labelling Investigation,
Chai Benfu, Zhu Xiulin, and Yang Lianfang. May 80, 15p
Included in Chinese Medical Jnl., v93 n5 p316-330 1980.

The effect of cast immobilization on bone turnover is investigated by double tetracycline labelling in 66 rabbits. In normal unimmobilized rabbits the appositional growth rates of newly-formed bones of the left and right femora were 1.95 microns and 2.00 microns per day and those of the left and right tibiae were 1.6 microns and 1.5 microns per day. The formation rates of the newly-formed bones of the left and right femora were 0.015% and 0.018% per day and of the left and right tibiae were 0.023% and 0.022% per day. Following cast immobilization for from 20 to 100 days the femur and tibia of the left immobilized limb showed much more new bone formation than the 2 bones of the contralateral nonimmobilized limb, however, there was also even more femur and tibia resorption. This resorption far exceeded bone formation leading eventually to ostoeporosis of the immobilized bones.

PB81-116576
(Order as PB81-116519, PC **A04**/MF **A01**)
Chinese People's Liberation Army Fourth Military Medical Coll.
Experimental Studies on the Development of Arterial and Venous Collateral Circulation After Replantation of Severed Limbs,
Lu Yupu, Li Rensheng, Shi Kaijun, and Xu Laitang. May 80, 4p
Included in Chinese Medical Jnl., v93 n5 p331-334 1980.

This study is to find out the time required for the appearance of adequate arterial and venous collateral blood flow following replantation of severed limbs in dogs. Temporary occlusion of femoral artery up to 2 months after operation in 10 dogs resulted in rapid drop of skin temperature. Arteriography done 5 months postoperatively in 12 dogs revealed little or no formation of collateral vessels at the site of replantation. Ligation of the femoral vein could be performed safely as early as the 8th postoperative day. Venography 8 days to 2 months after operation in 10 dogs revealed rich collateral vessel formation at the site of reunion.

PB81-116584
(Order as PB81-116519, PC **A04**/MF **A01**)
Nanjing Army General Hospital (China).
The Management of 125 Cases of External Gastrointestinal Fistula.
May 80, 6p
Included in Chinese Medical Jnl., v93 n5 p335-340 1980.

The authors treated 125 cases of external gastrointestinal fistula from January 1971 to March 1978. 115 patients were cured and 10 died. The chief cause of failure was intraperitoneal sepsis.

PB81-116592
(Order as PB81-116519, PC **A04**/MF **A01**)
Jishuitan Hospital, Beijing (China).
Clinicopathologic Observations on Tangential Eschar Excision in Deep Burns,
Wang Xuewei, and Liu Jiaqi. May 80, 6p
Included in Chinese Medical Jnl., v93 n5 p341-346 1980.

Clinicopathologic observations on 11 patients with third and mainly deep second degree burns treated by appropriately early proper depth tangential eschar excision with adequate coverage by autografts, homografts, or vaseline cotton saturated with antibiotics before releasing the tourniquet are presented. The clinical value of the procedure is discussed in the light of the pathohistologic analyses providing pointers for further study of the method and its clinical application.

PB81-116600
(Order as PB81-116519, PC **A04**/MF **A01**)
Zhejiang Medical Coll., Hangzhou (China). Second Affiliated Hospital.
Atrioventricular Junctional Tachycardia with Wenckebach Phenomenon,
Huang Lingyang, Lin Naicheng, Wu Minyi, and Wu Zhifang. May 80, 6p
Included in Chinese Medical Jnl., v93 n5 p347-352 1980.

This report presents 2 cases of atrioventricular junctional rhythm with Wenckebach phenomenon, one was nonparoxysmal junctional tachycardia with both retrograde and antegrade Wenckebach phenomenon and the other paroxysmal junctional tachycardia with antegrade Wenckebach phenomenon and complete bundle branch block.

PB81-117020 PC **A04**/MF **A01**
Oregon Univ. Health Sciences Center, Portland.
Smoking and Chronic Airways Obstruction.
Final rept. 1973-80,
A. Sonia Buist. 30 Sep 80, 62p NIH-N01-HR-2900-F
Contract N01-HR-3-2900
See also report dated 16 May 80, PB80-184625.

The purpose of this contract was to evaluate the role of the single breath N2 test (SBNT) as a means of identifying the smoker who is at risk of progressing to chronic airflow limitation, and to obtain further information about the natural history of chronic airflow limitation and the effect of smoking cessation on lung function. The approach was to carry out a population survey in collaboration with investigators at McGill University and the University of Manitoba in order to determine the relationship between the SBNT variables and age, sex and smoking. After this to follow two groups of adults over a period of years using a respiratory symptom questionnaire, spirometry, and the SBNT. From the collaborative population survey, we established the relationship between the SBNT variables and age, sex and smoking. The longitudinal studies have provided important information on rates of change of lung function and factors which affect these and have shown that an abnormal SBNT almost always precedes an abnormal FEV1 but that many smokers with an abnormal SBNT never develop an abnormal FEV1. With smoking cessation, all measures of lung function improve and symptoms virtually disappear. The longitudinal studies are being continued.

PB81-118457 Not available NTIS
National Bureau of Standards, Washington, DC.
Determination of Serum and Blood Densities.
Final rept.,
L. T. Sniegoski, and J. R. Moody. Aug 79, 2p
Pub. in Anal. Chem. 51, n9 -1577-1578 Aug 79.

A simple semi-micro method for the determination of blood and serum densities was developed. The density values were in good agreement with those obtained by the use of a 10-mL pycnometer.

PB81-118655 PC **A11**/MF **A01**
Human Services Research Inst., Washington, DC.
Assessing the Needs of the Community Support Program Target Population: Selected Methods for National and State Application.
Final rept.,
John W. Ashbaugh, Maryann K. Hoff, Valerie J. Bradley, and Michele Reday. 31 Oct 80, 232p
Contract PHS-278-79-0036(OP)

The report reviews existing needs assessment data and methods relevant to programs for the chronically mentally ill. It discusses the strengths and weaknesses and related utility of the data or methods for defining the size, characteristics, and service needs and problems of the chronically mentally ill. Electic needs assessment methods are defined for application at the national and state levels. The definitions include research design and sampling considerations, data collection and analytic techniques, and estimates of the resources required to effect the methods. The report includes copies of selected instruments, a list of persons to contact for more information on each of the methods reviewed, and an extensive bibliography on the subject.

PB81-119067 PC **A99**/MF **A01**
National Heart, Lung, and Blood Inst., Bethesda, MD. Cardiac Diseases Branch.
Ischemic Heart Disease SCOR Progress Reports: November 1, 1979.
Progress rept. (Annual).
Nov 79, 611p NHLI/IHD/SCOR-79
See also report dated Nov 78, PB-297 569.

Multidisciplinary clinical and fundamental research studies are conducted and directed at the reduction of death and disability from ischemic heart disease. Results are reported in such areas as the short and long term evaluation of therapies in various patient subgroups, evaluation of techniques for the early detection and follow up of reversibly and irreversibly damaged myocardium, natural history of ischemic heart disease, metabolic changes during acute ischemia, study of events surrounding the occurrence of perioperative infarction during cardiac surgery. These studies are focused on the clinical manifestations, biochemistry, anatomy, patho-physiology, electrophysiology, hematology, endocrinology, and psychosocial affects of ischemic heart disease.

PB81-121741 PC **A03**/MF **A01**
Veterans Administration, Washington, DC.
An Analysis of Study to Determine the Intensity of Nursing Care Required, Veterans Administration Hospital, Providence, Rhode Island,
Florence M. McBride. 7 Oct 63, 34p VA/NPR-10

One of fourteen Veterans Administration Hospitals that participated in a study designed to seek an appropriate unit of measurement of nursing care. It was felt that, essentially, the amount of direct nursing care required by patients in various stages of illness might constitute the best measure. A second (2 day) study was conducted to test some theories regarding the original study, but in this hospital only. The observations made at the end of the studies were that quality direct care cannot be overemphasized and that rigid standards to account for all of the staff's time leaves no room for the badly needed warmth that should be exhibited toward patients. Final recommendations were that the observer method be used for future studies rather than the diary method; a study be conducted to determine the amount of direct care given by non-nursing members; and that a study be conducted to determine the amount of time spent in indirect care because it seems to be considerably greater than that spent in direct care, and may be more revealing.

PB81-121758 PC **A03**/MF **A01**
Veterans Administration, Washington, DC.
To Arrive at a Means of Ascertaining the Staff Nurses' Concept of Competency by Utilizing an Opinion Survey Sheet, Veterans Administration Hospital, Tuscaloosa, Alabama,
Joseph L. Clark. 1965, 29p VA/NPR-18

A review was made of selected literature. Opinion survey sheets were distributed to forty-six nurses, asking only that the participant list those qualities, in one word where possible, which she felt the staff nurse should possess. Five hundred and eighty-four of a toal of 919 responses fell into 'personal characteristics' category, suggesting the importance of personal characteristics in relation to functional skills, as viewed by the respondents. The opinion survey sheet seemed to be potentially valuable, but needs further development, as a research tool, it was felt. Includes sample survey and bibliography.

PB81-121766 PC **A02**/MF **A01**
Veterans Administration, Washington, DC.
Staffing a Supervisory Unit, Veterans Administration Hospital, Salisbury, North Carolina,
Garlan D. Groley. 1963, 11p VA/NPR-8

It was hoped that through this study a tool would be developed which would enable head nurses and supervisors to more effectively look at utilization of staff. Included in the discussion were some variables to consider in staffing such as type of patient, training and experience of personnel, nursing care, etc. In the general review of staffing needs with all levels of nursing personnel, it was felt that staffing was adequate. Methodology was participant-observation; review of staffing needs; critical review of time schedules and assignments; and critical review of the qualifications of personnel assigned to the supervisory unit. An analysis of staff utilization (followed by suggestions) was made, such as frequently evaluating established goals and objectives and bringing them up to date as is necessary. In conclusion, it was felt that the nursing care program for this group of patients was satisfactory, but that more could be done by closer follow-up at all levels.

PB81-121774 PC **A02**/MF **A01**
Veterans Administration, Washington, DC.
Planning an Intensive Care Unit for Medical Care Patients, Veterans Administration Hospital, Cincinnati, Ohio,
Corinne Tanner. 1962, 8p VA/NPR-6

A brief summary of a project for planning an Intensive Care Unit. Outlined are suggested policies and practices for use in the Intensive Care Unit listing the purpose and objectives and organization. Also suggests admission criteria and sets forth policies for authority and patient transfer.

PB81-121790 PC **A03**/MF **A01**
Veterans Administration, Washington, DC.
The Role of the Clinical Nursing Specialist as Perceived by the Professional Nurse Staff on a Selected Psychiatric Unit, Veterans Administration Hospital, Tuscaloosa, Alabama,
Donald R. Olley. Nov 66, 50p VA/NPR-27

The purpose of the study was to determine the emerging role of a Clinical Nursing Specialist as

perceived by the professional nurse staff assigned on a selected psychiatric unit. An opinionnaire, focusing on selective functions of the specialist and some anticipated results of assigning the specialist, was administered to the professional nurse staff on a psychiatric unit shortly after the specialist was assigned to the unit. The professional nurse staff included the head nurse, the specialist, and seventeen staff nurses. Approximately five months later the opinionnaire was re-administered to the same people. A comparison of the two surveys revealed an emerging role definition of the Clinical Nursing Specialist. In both surveys the staff nurses identified six functions as being most important for the nursing specialist. These functions included the areas of: identification of nursing care problems; development of individualized nursing care plans; planning with other disciplines; care for the 'problem patients'; assistance for the staff nurses in understanding patient behavior; and interpretation of nursing's role and activities to other disciplines. These same functions were also given top priority by the head nurse and specialist in both surveys.

PB81-121972 PC **A02**/MF **A01**
Veterans Administration, Washington, DC.
Reconditioning and Reactivation of Ward 4A, Aspinwall Division, Veterans Administration Hospital, Pittsburgh, Pennsylvania,
Marian R. Watson. 1 May 63, 17p VA/NPR-13

A project undertaken to recondition and reactivate a ward that had been closed temporarily. Some objectives were to set up the ward as a model ward to use as a pattern for other wards and thus begin standardization within this division; to provide adequate nursing care and supervision with a minimum of personnel; and to develop a ward where the patient assumes some of the responsibility for his personal care and needs. The Self Care Unit was evaluated six months later, but it was not determined what the real value of this type of care was. A final comment would be made at the end of nine and one half months of operation.

PB81-122046 PC **A02**/MF **A01**
Veterans Administration, Washington, DC.
Establishing a Day Care Center, Veterans Administration Hospital, Oklahoma City, Oklahoma,
Orena M. Shaw. 1962, 8p VA/NPR-5

A summary of the experiences of a trainee participating in establishing a Day Care Center. The trainee was delegated the authority to establish and fulfill nursing services' responsibility in the planning and activation of the Day Care Center. The objectives to be achieved in the project included becoming better acquainted with the concepts of Psychiatric Nursing; to obtain experience in preparation of correspondence to identify and initiate the planning required of Nursing Service in the establishment of a new program; to gain experience in multi-disciplinary planning and action. The author concludes that it was a worthwhile experience and that the objectives were met. A bibliography is included.

PB81-122053 PC **A04**/MF **A01**
Veterans Administration, Washington, DC.
A Utilization Study of the Nursing Service Personnel in Outpatient and Admission Service, Veterans Administration Hospital, Cincinnati, Ohio,
Elizabeth McAleese. Mar 63, 64p VA/NPR-9

A study to evaluate the amount of direct nursing care given by all levels of personnel and to study the time spent in all major categories of nursing activity to determine if there was a need for realignment of duties. The methodology was the use of the work diary method according to G-7, M-2, Part V. Each level was examined to determine what percentage of time was spent on prescribed duties and these duties were in turn explored for possible realignment. Numerous tables depicting time spent on various categories are available along with several recommendations for improving utilization of time.

PB81-123176 PC **A07**/MF **A01**
Abt Associates, Inc., Cambridge, MA.
National Hospital Rate-Setting Study: A Comparative Review of Nine Prospective Rate-Setting Programs, First Annual Report.
Interim rept.,
Diane Hamilton, Renee Walter, Jerry Cromwell, Eve Horowitz, and Gilbey Kamens. Aug 80, 150p
DHHS/PUB/HCFA-80-03061
Contract DHEW-HCFA-500-78-0036
Health Care Financing Grants and Contracts Report.

The National Hospital Rate-Setting Study is the most comprehensive study of hospitals undertaken to date. Within the study, a broad array of data will be assembled on more than half the short-term general hospitals in the United States and used to examine many important aspects of hospital behavior and performance - finances, scope and composition of services, resource utilization, productivity, patient outcomes, organizational structure, and financial management. In addition, the study will examine the accessibility of hospital care to various socioeconomic groups as well as the overall structure of the hospital industry (entries, closures, mergers, and degree of market concentration and specialization). This report compares the salient characteristics of these nine prospective reimbursement programs, with emphasis on the adoption, implementation, and review processes, legal issues, and stringency, and equity characteristics.

PB81-123507 PC **A02**/MF **A01**
University of Southern California, Los Angeles.
Osteodystrophy and Divalent Ions in Kidney Failure.
Final rept. 11 Nov 74-10 Feb 77,
Shaul Massry. 20 Nov 80, 16p
Contract N01-AM-5-2234
See also report dated 7 Aug 75, PB-251 398.

Secondary hyperparathyroidism occurs early in the course of renal failure and elevated blood levels of parathyroid hormone (PTH) have been detected when creatinine clearance is reduced to less than 70 ml/min (1,2). It is accepted that this phenomenon is due to transient and recurrent or sustained hypocalcemia. At least three hypothesis have been advanced to explain the pathogenesis of hypocalcemia in patients with early renal failure. These include phosphate retention (3,6), skeletal resistance to the calcemic action of PTH (7,9), and altered vitamin D metabolism. The zeal and the vigor with which the proponents of these hypotheses defended their concepts have creared the impression that a major controversy exists. The author believes that these possibilities are not necessarily mutually exclusive, but rather are interrelated and together form a unified and integrated explanation for the hypocalcemia.

PB81-124083 PC **A02**/MF **A01**
Veterans Administration, Washington, DC.
Automatic Replenishment of Ward Supplies by Central Service, Veterans Administration Hospital, Cincinnati, Ohio,
Grace Fortenberry. 1964, 16p VA/NPR-15

A project for planning and implementing a system for automatic replenishment of supplies on the nursing units by Central Service. The time study procedure, as contained in Program Guide G-7, M-2, Part V, was used and the data was tabulated through ADP. The current system of pick-up and delivery of supplies was evaluated to see what changes could be made and new ideas were explored through current literature as well as observations at another facility. Flow charts illustrate the steps involved, the number and catagory of personnel and the number of man minutes required each day for pick-up and delivery by the old and new methods. Central Service personnel were able to automatically replenish supplies on all wards with an increase of 10 minutes per day, but they had better control of supplies and could check stock levels closely for dated items. The new system did not save manhours for Central Service personnel, but changed procedures allowed them to give added service without increasing the staff.

PB81-124471 PC **A04**/MF **A01**
Veterans Administration, Washington, DC.
Role of Nursing Service in the Programs of Posthospital Care for the Veteran Patient, Veterans Administration Hospital, North Little Rock, Arkansas,
Earl L. Kephart. Jan 67, 53p VA/NPR-28

This was an explanatory study which attempted to establish a relationship between patients' posthospital nursing care needs and the ability of nurses to identify these needs and recommend referral to resources which could best meet the needs. Based on the data obtained and within the confine of the scope and limitations of this study, the following conclusions were revealed: a minimum of 15 percent of the patients discharged from the two divisions (medical-surgical & psychiatric) of this hospital would have benefited from referral to community home nursing services; from a study of these patients who have been referred to community home nursing services, general characteristics can be found which would be helpful in developing selection criteria; and that because of lack of suitable previous experience, professional nurses have only a limited knowledge of the community resources available for post-hospital continuity of care. Includes an appendix and bibliography.

PB81-124794 PC **A04**/MF **A01**
Minnesota Univ., Minneapolis. Dept. of Medicine.
Oxidant-Induced Erythrocyte Destruction in Chronic Renal Disease.
Completion rept. 1 Nov 76-30 Sep 79,
John W. Eaton, Carl W. Kjellstrand, and Harry S. Jacob. 30 Nov 79, 60p
Contract N01-AM-6-2214
See also report dated 12 Jan 78, PB-285 457.

This study centered on the detection, analysis, and counteraction of oxidant elements in the hemodialysis system as well as investigation of the etiology of red cell oxidant sensitivity of some uremic petients with the ultimate goal of prevention of accelerated erythrocyte destruction in patients with chronic renal disease. Through testing a variety of dialysis waters, chlorine and chloramines were identified as the agents responsible for oxidant damage to red cells during hemodialysis, and a technique for detoxifying them was developed. An intrinsic defect was detected in the plasma of a subpopulation of dialysis patients (approximately 30 percent of almost 400 patients being analyzed at 8 different centers) which predisposed their erythrocytes to damage from oxidant stress. The frequency of this defect was similar in all dialysis centers studied, indicating no relationship to conditions of dialysis. Since the method of detection of the intrinsic defect was not always reproducible , the nature of ascorbate: red cell oxidation was examined by measuring the oxygen species which produce oxidant damage and by investigating conditions which accentuate the generation of such species in vitro. The ways in which the 'intrinsic defect' produced oxidant damage to red cells were also investigated. Finally, the purification and identification of the plasma factor responsible for the intrinsic defect was attempted.

PB81-800245 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Health Care Requirement Characteristics of Communities and Populations. January, 1976-November, 1980 (Citations from the NTIS Data Base).
Rept. for Jan 76-Nov 80,
Elizabeth A. Harrison. Nov 80, 141p
Supersedes PB80-800873, and NTIS/PS-78/1141.

Demography, environmental factors, nutritional factors, societal factors, socioeconomic status, and socioeconomic factors affecting health, and health resource distribution as related to health care requirements are the subjects covered in the selected abstracts of research reports. (This updated bibliography contains 134 citations, 11 of which are new entries to the previous edition.)

PB81-800252 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Emergency Medical Services: Health Planning. 1964-November, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-Nov 80,

Elizabeth A. Harrison. Nov 80, 101p
Supersedes PB80-800667, and NTIS/PS-78/1002.

Communication, training, transportation, emergency care facilities and community education for rural and urban areas are included in the bibliography. The reports discuss plan implementation and plan development for states and regions. Ambulance and hospital emergency services are also discussed. (This updated bibliography contains 94 citations, 4 of which are new entries to the previous edition.)

PB81-800260 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Emergency Medical Services: Costs. 1964-November, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-Nov 80,
Elizabeth A. Harrison. Nov 80, 63p
Supersedes PB80-800659, and NTIS/PS-78/1001.

Cost effectiveness of medical equipment, recommendations for reducing costs, and methodology for estimating financial impact of emergency medical services systems is covered by the selected citations. Analysis, estimating and projections of costs are discussed as related to models, resources, legislation, Government funds, outcome measurement, financing, and operations. (This updated bibliography contains 56 citations, 4 of which are new entries to the previous edition.)

PB81-800278 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Preventive Medicine: Cancer and Cardiovascular Diseases. June, 1976-October, 1980 (Citations from the NTIS Data Base).
Rept. for Jun 76-Oct 80,
Elizabeth A. Harrison. Nov 80, 101p
Supersedes PB80-801012, and NTIS/PS-78/1130.

The bibliography is divided into two parts: Preventive medicine of cancer and preventive medicine of cardiovascular diseases. The selected abstracts cover subjects, such as, health education, employee health programs, and health screening. Diagnostic tests, health risks, health care technology, and epidemiology are also subjects discussed. (This updated bibliography contains 94 citations, 21 of which are new entries to the previous edition.)

PB81-800286 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Emergency Medical Services: Utilization. 1964-November, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-Nov 80,
Elizabeth A. Harrison. Nov 80, 84p
Supersedes PB80-800634, and NTIS/PS-78/0999.

Predicting demand, utilization patterns, extent of utilization, and resources utilized are subjects covered by the citations. The specific facilities discussed are hospital emergency rooms, health maintenance organizations, neighborhood health centers, and ambulance services. Attitudes and surveys related to utilization of emergency medical services are included. (This updated bibliography contains 77 citations, 3 of which are new entries to the previous edition.)

PB81-800302 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Women as Consumers and Providers of Health Care. 1964-October, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-Oct 80,
Elizabeth A. Harrison. Nov 80, 195p
Supersedes PB80-800188, and NTIS/PS-78/1005.

Citations concerned with health and the delivery of health services as related to the needs and demands of women, both as providers and users of services are included in the bibliography. Subjects covered are medical rights, health manpower education, sex discrimination, family planning, and legislation. (This updated bibliography contains 188 citations, 26 of which are new entries to the previous edition.)

PB81-800310 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Preventive Medicine: Diet and Nutrition. December, 1974-October, 1980 (Citations from the NTIS Data Base).
Rept. for Dec 74-Oct 80,
Elizabeth A. Harrison. Nov 80, 58p
Supersedes PB80-800972, and NTIS/PS-78/1132.

The selected abstracts explore the importance of diet and nutrition in the prevention of diseases. General areas covered by the abstracts are health planning, maternal health care, health education, infant health care, geriatrics, and health risks. Cholesterol, obesity, fats, and vitamins as related to health are subjects also included in the bibliography. (This updated bibliography contains 51 citations, 8 of which are new entries to the previous edition.)

PB81-800328 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Preventive Medicine: Major Studies. 1964-November, 1979 (Citations from the NTIS Data Base).
Rept. for 1964-Nov 79,
Elizabeth A. Harrison. Nov 80, 269p
Supersedes PB80-800998, and NTIS/PS-78/1135.

The selected abstracts of research reports cover major studies on preventive medicine. The bibliography was compiled for the person interested in the broad aspect of prevention. Mental health, costs, drugs, cancer, education, immunization, coronary disease, diet and nutrition are just a few of the subjects cited. Specific bibliographies covering more detailed subjects of preventive medicine have been prepared. (This updated bibliography contains 188 citations, 28 of which are new entries to the previous edition.)

PB81-800336 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Preventive Medicine: Mental Health. April, 1975-October, 1980 (Citations from the NTIS Data Base).
Rept. for Apr 75-Oct 80,
Elizabeth A. Harrison. Nov 80, 107p
Supersedes PB80-801004, and NTIS/PS-78/1134.

General areas covered by the selected abstracts are: Health screening, health care requirements, and health planning. More specific subjects related to preventive medicine of mental health include communities mental health services, long term care, school health programs, child health services, rural health services, and services for elderly persons. Mental health encompasses mental retardation, neuroses, child abuse, drug abuse and other mental disorders. (This updated bibliography contains 100 citations, 17 of which are new entries to the previous edition.)

PB81-800393 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Preventive Medicine: Vaccines and Immunization. 1964-October, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-Oct 80,
Elizabeth A. Harrison. Nov 80, 69p
Supersedes PB80-800980, and NTIS/PS-78/1133.

Health surveys, preschool and school health immunization, and disease control are subjects covered by the selected abstracts. Specific diseases discussed in relation to vaccines and immunization are swine flu, brucellosis, measles, hepatitis, meningitis, schistosomiasis, and poliomyelitis. Other diseases are whooping cough, mumps, tetanus, chickenpox, and rubella. (This updated bibliography contains 63 citations, 6 of which are new entries to the previous edition.)

PB81-800500 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Preventive Medicine: Costs. September, 1974-October, 1980 (Citations from the NTIS Data Base).
Rept. for Sep 74-Oct 80,
Elizabeth A. Harrison. Nov 80, 105p
Supersedes PB80-800964, and NTIS/PS-78/1131.

Cost effectiveness, cost analysis, economic impact, and benefit cost analysis are areas covered relating to preventive medicine in the selected abstracts. Specific services included are: Preventive dentistry, public health programs, disease control, health screening, child health services, drug abuse, and health education. (This bibliography contains 98 citations, 12 of which are new entries to the previous edition.)

PB81-800518 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Health Care Utilization Characteristics of Communities and Populations. February, 1976-November, 1980 (Citations from the NTIS Data Base).
Rept. for Feb 76-Nov 80,
Elizabeth A. Harrison. Nov 80, 142p
Supersedes PB80-800956, and NTIS/PS-78/1140.

The bibliography contains selected abstracts of research reports covering socioeconomic status, socioeconomic factors, demography, environmental factors, nutritional factors, and societal factors affecting health, and health resource distribution as related to health care utilization. (This updated bibliography contains 144 citations, 7 of which are new entries to the previous edition.)

SGAE-3049 PC **A02**/MF **A01**
Oesterreichische Studiengesellschaft fuer Atomenergie G.m.b.H., Vienna.
Influence of Radio- and Chemotherapy on DNA Repair of Peripheral Lymphocytes of Tumor Patients.
W. Klein, G. Alth, H. Klein, and H. Koren. Jul 79, 11p BL-275/79
In German.
U.S. Sales Only.

The influence of radiotherapy and chemotherapy, respectively, on DNA excision repair was investigated in lymphocytes of the peripheral blood of 10 and 5 patients with malignancies. No effects on DNA repair were found using only betatron or exp 60 Co-irradiation under normal conditions. Combination of both irradiation schedules over a longer period of therapy provoked an inhibition of DNA repair. Chemotherapy inhibits DNA repair immediately after starting therapy, but after relatively short time, the extent of DNA repair increases above normal level. (Atomindex citation 11:517755)

6F. Environmental Biology

AD-A091 048/9 PC **A04**/MF **A01**
Robert S Kerr Environmental Research Lab Ada OK
Glossary of Aquatic Ecological Terms,
John E. Matthews. Feb 72, 61p
Revision of report dated Sep 69.

This Glossary is intended to provide familiarity and understanding of technical terminology specific to the discipline of aquatic ecology and will serve as a convenient reference for all professionally trained persons concerned with water pollution control. Terms specifically identifying or describing organisms have generally been excluded from this work.

AD-A091 303/8 PC **A17**/MF **A01**
Army Engineer Waterways Experiment Station, Vicksburg, MS.

Proceedings of the Annual Meeting (14th) Aquatic Plant Control Research Planning and Operations Review, Held at Lake Eufaula, Oklahoma on 26-29 November 1979.
Final rept.
Oct 80, 393p Rept no. WES-MP-A-80-3

Contents: Initial Plans for Aquatic Weed Research by the U.S. Environmental Protection Agency; USAE Division/District Presentations; Aquatic Plant Problems--Operations Activities; Chemical Control Technology Development; Biological Control Technology Development; Mechanical Control Technology Development; Problem Identification and Assessment for Aquatic Plant Management; Natural Succession of Aquatic Plants; Large-Scale Operations Management Test of Insects and Pathogens for Control of Waterhyacinth in Louisiana; Large-Scale Operations Management Test to Evaluate Prevention Methodology for Control of Eurasian Watermilfoil in Washington; Large-Scale Operations Management Test Using the White Amur at Lake Conway, Florida; and Aquatic Plant Control Activities in the Panama Canal Zone.

INIS-mf-5579 PC **A03**/MF **A01**
Kiel Univ. (Germany, F.R.).
Effects of Power Plant Cooling on Aquatic Biota. An Indexed Bibliography. Report No. 58.
H. Moeller. 1978, 33p
U.S. Sales Only.

Several bibliographies and reviews on 'ecological consequences of power plant cooling' have been published. Other reports compile additional data, but are not available to the public. Altogether, more than 3,000 literature citations have been gathered until now, too many to be studied by an individual scientist. The bibliography becomes more comprehensible if only titles are accepted that deal with power plant cooling itself, neglecting the influence of temperature and other stress factors on organisms as examined under laboratory conditions. Among these 600 remaining titles, about 370 are published in journals and periodicals available to the public. They are presented in this bibliography. (Atomindex citation 11:517185)

ORNL/TM-7351 PC **A14**/MF **A01**
Oak Ridge National Lab., TN.
Geoecology: A County-Level Environmental Data Base for the Conterminous United States.
R. J. Olson, C. J. Emerson, and M. K. Nungesser. Sep 80, 312p ESD-1537
Contract W-7405-ENG-26

The Geoecology Data Base represents a unique compilation of computerized environmental data for research and development needs. Environmental assessment and planning for energy development require rapid access to data at appropriate spatial and temporal scales. In the Environmental Sciences Division (ESD) at Oak Ridge National Laboratory (ORNL), we have developed an integrated data base of diverse environmental resource information from extant sources. Data are stored at the county level of resolution for the conterminous United States with some data available for subcounty units within larger, more diverse eastern counties. The Geoecology Data Base contains selected data on terrain and soils, water resources, forestry, vegetation, agriculture, land use, wildlife, air quality, climate, natural areas, and endangered species. Basic files on human population are also included to complement the environmental files. Data are stored in metric-SI units. The Geoecology Data Base is currently fulfilling diverse ongoing research needs while it is being expanded and updated as needs and new data are identified. This report is both a documentation and a user's guide to the Geoecology Data Base. It describes the Data Base design, illustrates applications, provides examples of accessing the Data Base, and gives general information on the data set contents. (ERA citation 05:035383)

PB81-117947 PC **A08**/MF **A01**
Wisconsin Univ.-Madison.
Responses of Stream Invertebrates to an Ashpit Effluent, Wisconsin Power Plant Impact Study,
John J. Magnuson, Anne M. Forbes, Dorothy M. Harrell, and Judy D. Schwarzmeier. Aug 80, 167p
EPA-600/3-80-081
Grant EPA-R-803971

Fly ash from the 527-MW Coal-fired Columbia Generating Station Unit I (Columbia Co., Wisconsin) is discharged as a slurry into an adjacent ashpit. Water from the ashpit is pumped to a ditch that joins the ashpit drain and Rocky Run Creek before they reach the Wisconsin River. Habitat alterations have been noted as relatively minor changes in water quality parameters (e.g., alkalinity, hardness, pH, and turbidity), as increased amounts of some dissolved trace elements (Cr, Ba, Al, Cd, and Cu), and as the precipitation of trace elements (Al, Ba, and Cr) into a floc that coats the stream bottoms. The ashpit drain became an unsuitable habitat for aquatic invertebrates after Columbia I began operating. Rocky Run Creek is still a suitable habitat for many aquatic invertebrates, but evidence of sublethal stresses and habitat avoidance exists.

PB81-118572 Not available NTIS
National Bureau of Standards, Washington, DC.
Report on Reference Materials and Standard Solutions,
R. Alvarez. 1978, 1p
Pub. in Referee Reports: Jnl. Assoc. Off. Anal. Chem. 61, n2 p323 1978.

As General Referee on Reference Materials and Standard Solutions for the Association of Official Analytical Chemists, the author has identified SRM's issued by NBS that are applicable to AOAC activities. These include: SRM 1643, a simulated fresh water with certified concentrations of 17 trace elements; SRM 1570, Spinach, and SRM 1575, which are certified for major, minor, and trace constituents; and SRM's 2661-2667, Organic Solvents on Charcoal which have certified amounts of organic toxic agents. The AOAC membership has been requested to communicate requirements for new SRM's.

PB81-121089 PC **A02**/MF **A01**
Health Effects Research Lab., Cincinnati, OH.
Health Effects Associated with Wastewater Treatment and Disposal.
Journal article,
N. E. Kowal, and H. R. Pahren. Nov 80, 14p
EPA-600/J-80-118
Pub. in Jnl. WPCF, v52 n6 p1312-1325 Jun 80.

A review of the annual literature on health effects associated with wastewater treatment and disposal.

PB81-121592 PC **A02**/MF **A01**
Rocky Mountain Forest and Range Experiment Station, Fort Collins, CO.
Status, Ecology, and Management of the Lesser Prairie Chicken.
Forest Service general technical rept. (Final),
Maple A. Taylor, and Fred S. Guthery. Sep 80, 21p FSGTR-RM-77

This report assesses past and recent distribution of the lesser prairie chicken; summarizes knowledge of its life history, ecology and management; and identifies research needs.

PB81-124828 PC **A02**/MF **A01**
Northeastern Forest Experiment Station, Broomall, PA.
Dutch Elm Disease Control: Performance and Costs.
Forest Service research paper (Final),
Willliam N. Cannon, Jr., and David P. Worley. 1976, 14p NEFES/81-129, FSRP-NE-345

Municipal programs to suppress Dutch elm disease have had highly variable results. Performance as measured by tree mortality was unrelated to control strategies. Costs for control programs were 37 to 76 percent less than costs without control programs in the 15-year time-span of the study. Only those municipalities that conducted a high-performance program could be expected to retain 75 percent of their elms for more than 20 to 25 years.

PB81-126534 PC **A03**/MF **A01**
Rutgers - The State Univ., New Brunswick, NJ. Water Resources Research Inst.
Fate of Coliform Bacteria in the Upper New York Bay.
Final rept.,
Melvin S. Finstein, and Merry L. Morris. Oct 80, 44p W81-00324, OWRT-A-049-NJ(1)
Contract DI-14-34-0001-8032

Quantitative and qualitative analyses were made of the coliforms in both the primary treated effluent and the receiving waters (New York Bay) of the Passaic Valley Sewerage Commissioners (PVSC) treatment plant. The membrane procedure was used to determine standard coliform counts and colonies were identified with the API 20E enteric identification system which consists of a battery of 23 biochemical tests. Treatment at the PVSC plant consists of primary sedimentation and, in season, chlorination. Water samples were taken at 11 stations in the Bay with a Kemmerer bottle. Sediment samples were taken with an Eckman dredge and were diluted with a phosphate buffer solution. The standard coliform count of the effluent was 100,000 to 5,000,000/ml. In order of abundance the major coliforms were: Klebsiella pneumoniae, Enterobacter cloacae, Citrobacter freundii, and Escherichia coli. In the Bay near the discharge field, the coliform count ranged from 210 to 740/ml. Leading contributors were: Enterobacter cloacae, Klebsiella pneumoniae, Citrobacter freundii, Escherichia coli, and Aeromonas hydrophila. Laboratory studies showed that the addition of effluent slow the disappearance of three of the coliforms from Bay water.

PB81-127334 PC **A03**/MF **A01**
Ohio State Univ., Columbus. Water Resources Center.
The Mechanism of Ozone Inactivation of Waterborne Viruses.
Completion rept.,
Otis J. Sproul, and Chi K. Kim. Jul 80, 37p W81-00315, OWRT-B-013-ME(2)
Prepared in cooperation with Maine Univ. at Orono. Land and Water Resources Inst.

Ozone has received recent attention as an alternative disinfectant to chlorine in water and waste water treatment practices due to its more rapid powerful germicidal activity and no reported side-effects as can result from chlorination, such as taste, odor, and toxic byproducts. The present study sought to determine the ozone inactivation mechanism for viruses in water using the f2 RNA containing virus and T4 DNA containing virus bacteriophages as models. It was concluded that ozone inactivated the f2 and T4 bacteriophages by attacking capsid protein, with liberation and inactivation of the nucleic acid. RNA from f2 bacteriophage at least partially inactivated prior to release from the capsid, with the inactivation rate slower than the whole phage but faster than the naked RNA exposed to ozone. Finally, DNA released from T4 bacteriophage was rapidly inactivated by ozone at about the same rate as the intact phage. The study results suggested that the RNA of enteric viruses may retain their infectivity after liberation from the viral particle during ozonation of water and waste water, if they are inactivated by ozone in the same manner as the f2 phage.

PNL-SA-8134 PC **A02**/MF **A01**
Battelle Pacific Northwest Labs., Sequim, WA. Marine Research Lab.
Effects of Prudhoe Bay Crude Oil in Sediment on Abarenicola Pacifica in Laboratory and Field Experiments.
J. M. Augenfeld. Feb 80, 21p
Contract AC06-76RL01830

Behavioral responses of organisms are often sensitive indicators of changes in the environment over short time frames. The rate of burrowing of Abarenicola pacifica, a lugworm typical of muddy tidal flats, was studied to determine its response to the presence of hydrocarbons in the environment. If a reduction in burrowing rates is reflected in reduced food intake, a decline in nutritional status might be expected. The level of free amino acids in the tissues was examined as a possible indicator of nutritional status. (ERA citation 05:037233)

PNL-3391 PC **A04**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Assessment of Environmental Health and Safety Issues Associated with the Commercialization of Unconventional Gas Recovery: Tight Western Sands.
E. F. Riedel, C. E. Cowan, and T. J. McLaughlin. Feb 80, 60p

Contract AC06-76RL01830

Results of a study to identify and evaluate potential public health and safety problems and the potential environmental impacts from recovery of natural gas from Tight Western Sands are reported. A brief discussion of economic and technical constraints to development of this resource is also presented to place the environmental and safety issues in perspective. A description of the resource base, recovery techniques, and possible environmental effects associated with tight gas sands is presented. (ERA citation 05:037170)

6H. Food

N81-10445/7 PC **A08**/MF **A01**
Auburn Univ., AL. Dept. of Agricultural Engineering.
Grain Quality Inspection System.
Final Report, 23 Jan. 1977 - 30 Sep. 1979.
C. A. Flood, Jr., D. P. Singletow, and S. N. James. 30 Sep 79, 167p NASA-CR-163682
Grant NSG-8047

A review of grain quality indicators and measurement methods was conducted in order to assess the feasibility of using remote sensing technology to develop a continuous monitoring system for use during grain transfer operations. Most detection methods were found to be too slow or too expensive to be incorporated into the normal inspection procedure of a grain elevator on a continuous basis. Two indicators, moisture content and broken corn and foreign material, show potential for automation and are of an economic value. A microprocessor based system which utilizes commercially available electronic moisture meter was developed and tested. A method for automating BCFM measurement is described. A complete system description is presented along with performance test results.

PATENT-4 228 196 Not available NTIS
Department of Agriculture, Washington, DC.
Process for Preparing Precooked Potato Products.
Patent,
Merle L. Weaver, and Keng C. Ng. Filed 2 Oct 79, patented 14 Oct 80, 8p PB81-116659, PAT-APPL-6-081 245
Supersedes PB80-128259.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Precooked potato products are prepared by a process wherein the potatoes are washed, peeled, and treated whole or cut into pieces. The so-prepared potatoes are cooked at a temperature below the temperature at which sloughing of the potato surface would occur if the whole potato were cooked to its center at that temperature. Then, the potatoes are heated in air and cooked again at a temperature of about 50 to 100C. Following the last cooking procedure, the potatoes are frozen, chilled, or retorted to preserve them in the absence of starch suspensions. To prepare them for consumption, the potatoes can be fried or boiled.

PB81-114803 PC **A02**/MF **A01**
Unilever Research Lab., Vlaardingen (Netherlands).
Fermentation von Abwasser in Einem Saeulenfermenter (Fermentation of Waste Water in a Tower Fermenter),
F. C. H. Jongenelen, and H. Veldhoen. 1979, 23p
Text in German; summary in English.

For the fermentation of organic materials in waste water from food industries, it can be attractive to apply, instead of the activated sludge process, a process which yields single cell proteins (SCP). In contrast to activated sludge, the SCP product possesses nutritive value and can in principle be used in animal feeds. Laboratory experiments in a tower fermenter 1.2 m in height have shown that the process is stable within a wide range of operating conditions. In this paper a theoretical scaling-up model for estimating the optimum dimensions and operating conditions for a pilot plant with a capacity of 100 1 waste water per hour is discussed. The model is based on the assumption that the mass transfer of oxygen from an air bubble to the liquid phase is the rate-determining step of the fermentation process. The process efficiency of tower fermentation is compared with that of other biological waste water purification techniques.

PB81-114829 PC **A02**/MF **A01**
Unilever Research Lab., Vlaardingen (Netherlands).
Determination of Low Erucic Acid Levels in Oils and Fats,
P. W. Meijboom, and G. A. Jongenotter. 1979, 18p
Summary in German.

In view of requirements set in 1979 by the European Community regarding the reduction of erucic acid levels in foods, the authors developed a method by which concentrations down to 0.1% can be determined. The procedure and conclusions are discussed in brief.

PB81-118564 Not available NTIS
National Bureau of Standards, Washington, DC.
NBS Standard Reference Materials 1567, Wheat Flour, and 1568, Rice Flour, Certified for Concentrations of Selected Trace Element Nutrients and Environmentally Important Constituents.
Final rept.,
R. Alvarez, and H. L. Rook. Aug 78, 7p
Pub. in Proc. National Conf. on Wheat Utilization Research (10th), held at Tucson, AZ, Nov 16-18, 1977 p156-162 (Office of the Regional Administrator for Federal Research (Western Region), Science and Education Administration, U.S. Dept. of Agriculture, Berkeley, CA 94705, Aug 78.

The National Bureau of Standards has issued two unfortified flour Standard Reference Materials--a bleached wheat flour and a rice flour. The Certificates of Analysis for SRM 1567, Wheat Flour, and SRM 1568, Rice Flour list concentration values for selected trace element nutrients, environmentally important elements, and other trace elements of undefined function. These SRM's were developed because of the importance of trace elements, which are present in foods at or below the parts-per-million level and because of the difficulty of determining them reliably. The certified reference materials are intended primarily for evaluating the accuracy of these elemental determinations in flours and other cereal foods. They will be useful for developing reliable trace element methods, for calibrating the instrumentation used in these analyses, and for providing certified values to which experimental data acquired at different times by the same or different laboratories can be compared.

see individual report for order number and price
Federation of American Societies for Experimental Biology, Bethesda, MD. Life Sciences Research Office.
Evaluation of the Health Aspects of Food Ingredients.
Final rept.
1980,open series
Report of Select Committee on GRAS Substances.

This report, by a group of qualified scientists designated the Select Committee of GRAS Substances (SCOGS), provides an independent evaluation of the safety of malt syrup and extract as food ingredients when used in foods at present or projected levels.

FDA/BF-81/5. Malt Syrup and Extract. 1980, 24p PC A02, MF A01 **PB81-121402**
FDA/BF-81/4. Borax and Boric Acid. 1980, 36p PC A03, MF A01 **PB81-121410**

PB81-123283 PC **A24**/MF **A01**
Michigan State Univ., East Lansing. Dept. of Food Science and Human Nutrition.
Food Losses and Wastes in the Domestic Food Chain of the United States.
Final rept. 1 Sep 76-31 Aug 78,
D. R. Heldman. 1978, 568p NSF/RA-790406
Grant NSF-DAR76-80693

This study identifies locations within the domestic food chain (the process required to deliver food commodities to the consumer) where losses and wastes are significant. Focus is on establishing the strengths and weaknesses of current approaches to controlling losses and wastes, and on identifying areas where further research is needed. In order to assure an in-depth analysis for a few commodities, potatoes, apples, fresh milk, and fresh beef were selected as products for examination. The food chain was divided into portions. The first portion deals with post-harvest handling and/or preprocessing storage while the food commodities are in an unprocessed or unpackaged condition. At this point, emphasis is placed on a review of literature and an analysis of data during post-harvest handling, assembly, and transportation of raw product commodities. The second portion of the food chain deals with events occurring during product processing. Review and analysis focuses on sorting, grading, processing, packaging, and transportation of the processed commodities. The third portion of the food chain deals with warehousing, wholesaling, retailing, and transportation after processing. Individual working papers on specific product commodities and specific phases of the food chain make up the bulk of this report.

PB81-800229 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
GRAS (Generally Recognized as Safe) Food Ingredients. July, 1979-November, 1980 (Citations from the NTIS Data Base).
Rept. for Jul 79-Nov 80,
Edward J. Lehmann. Nov 80, 95p
See also 1964-June 1979, NTIS/PS-79/0650.

The bibliography covers chemical, biological and biochemical data related to the safety of specified food ingredients. Specifically, bioassay studies on the toxicology, teratology, genetics, nutrition, and oncogenetic aspects of food additives are summarized. The bibliography includes three areas of interest: Teratological and mutagenic evaluations; scientific literature reviews; and industrial surveys on the use of food chemicals. These reports have all been sponsored by the Food and Drug Administration. They are listed alphabetically according to food ingredient. (This updated bibliography contains 55 abstracts, all of which are new entries to the previous edition.)

6J. Industrial (Occupational) Medicine

AECB-1117 PC **A02**/MF **A01**
Atomic Energy Control Board, Ottawa (Ontario).
Background Paper for Regulations Related to the Exposure of Uranium Mine and Mill Workers.
Jan 78, 7p
U.S. Sales Only.

The Atomic Energy Control Board is modifying the Atomic Energy Control Regulations to include a maximum permissible exposure to radon daughters for uranium mine and mill workers. In January 1976, after consultation with the uranium producers, union, and government regulatory bodies, the AECB issued a directive endorsing a maximum permissible annual occupational exposure to radon daughters of 4 Working Level Months (WLM). This exposure limit was an interim guideline to be applied for at least one year. The Board staff and members of the Mine Safety Advisory Committee have examined available evidence on the excess risk of lung cancer owing to exposure to radon daughters since then, and have assessed the arguments for both raising and lowering the exposure limit. The evidence is still not conclusive, and further studies, especially epidemiological ones, are needed. Nevertheless, the Board considers that the interim guideline is acceptable in the light of the present state of knowledge and that it should be incorporated into the regulations. This document explains why the Board has made this decision and discusses a number of related issues. (Atomindex citation 11:529075)

LA-8459-MS PC **A03**/MF **A01**
Los Alamos Scientific Lab., NM.
Paraho Oil Shale Workers Occupational Health Study.
J. Rudnick, L. L. Garcia, G. L. Voelz, and H. F. Schulte. Jul 80, 31p
Contract W-7405-ENG-36

An occupational health and industrial hygiene study of the oil shale workers at the Department of Energy Anvil Points Oil Shale Mine and Retorting Facility near Rifle, Colorado, was conducted. This evaluation was to look specifically at the potential occupational health problems associated with the Paraho direct combustion retorting process. In addition, the mine, crushing plant, disposal, and auxiliary operations were also studied. Industrial hygiene data did not confirm any personal exposures in excess of industrial hygiene standards. However, area sampling did show that areas and operations would present significant exposures to some employees should such employees work full time in these areas. Commercial scale operations will require industrial hygiene control measures. The medical study performed on the Paraho employees indicates that there are no health problems or effects positively correlated with exposure to oil shale operations or its retorting products. The major health effect noted was from job-incurred injuries. Commercial scale operations will require periodic comprehensive medical evaluations as well as design of operations and equipment to avoid potential health and safety problems. (ERA citation 05:036008)

6K. Life Support

AD-A090 997/8 PC **A02**/MF **A01**
School of Aerospace Medicine, Brooks AFB, TX.
Molecular Sieve Generation of Aviator's Oxygen: Performance of a Prototype System under Simulated Flight Conditions,
Richard L. Miller, Kenneth G. Ikels, Mathew J. Lamb, Edward J. Boscola, and Robert H. Ferguson. 1980, 11p Rept no. SAM-TR-80-255
Pub. in Aviation, Space, and Environmental Medicine, v51 n7 p665-673 Jul 80.

No abstract available.

AD-A091 221/2 PC **A05**/MF **A01**
Navy Experimental Diving Unit, Panama City, FL.
Unmanned Evaluation of U.S. Navy EX-16 UBA Pre-Production Model.
Final rept.,
James R. Middleton. May 80, 90p Rept no. NEDU-9-80

The EX-16 UBA Pre-Production Model underwent unmanned performance testing in January through March 1980. Parameters evaluated were breathing resistance, carbon dioxide absorbent canister characteristics, and oxygen partial pressure setpoint control functions. All areas evaluated were found to be adequate for manned testing. (Author)

AD-A091 286/5 PC **A05**/MF **A01**
Navy Experimental Diving Unit, Panama City, FL.
Testing of Decompression Algorithms for Use in the U.S. Navy Underwater Decompression Computer.
Final rept. on Phase 1,
Edward D. Thalmann, Ian P. Buckingham, and W. H. Spaur. Aug 80, 76p Rept no. NEDU-11-80

Methods for programming a wrist worn Underwater Decompression Computer (UDC) were investigated and tested. All testing was done on the MK-15 UBA which supplies a constant P sub O2 of 0.7 ATA in N2. Testing was done submerged in water temperatures of 73 - 78 F and with dive subjects performing moderate exercise. A total of 445 mandives were conducted to depths of 175 FSW, and a total of 22 cases of decompression sickness occurred. A total of 5 methods for computing decompression profiles were investigated and of these one was selected as being the most suitable for programming the UDC. The method chosen would not decompress divers safely from all profiles so its use was restricted to a maximum time of 30 min at 150 FSW. This restriction was integrated into the program so the UDC could warn the diver if he were exceeding permissible limits at any depth. A total of 178 man-dives were done within the restriction placed on the UDC with only 2 cases of decompression sickness observed. A series of non-repetitive diving tables using the selected method was also produced to permit safely diving the MK 15 UBA without a UDC. (Author)

6L. Medical and Hospital Equipment

CEA-CONF-4737 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Services d'Electronique.
New Multiprocessor System to Automate an Intensive Care Unit in Cardiology.
H. Pangritz, B. Uhlmann, A. Tadei, J. Victor, and P. Roche. 1979, 6p CONF-790812-3
In French.International conference on medical physics, Jerusalem, Israel, 19 Aug 1979.
U.S. Sales Only.

This new multiprocessor system, is designed to automate an intensive care unit in cardiology. It contains intelligent modules including microprocessors, developped by the CEA, according to the rules of the international standard IEC 66.22 (GP-IB). These modules analyse the ECG from two different channels and detect a total of twenty arrhythmias. Up to eight of those modules can be connected to a controlling unit, linked to a matrix oriented plasma display and a function touch panel. This controller, developped by HMI, analyses the data files recorded from the arrhythmias analyser and monitors up to 10 different histograms. This technique of subdivision into independent modules with their own alarms, guarantees the safety of the system. Furthermore, by this method, maintenance is highly simplified. The basic system has been under clinical evaluation for 1 year. Percentages of true positive detection for three typical arrhythmias are: ventricular extrasystole 95%; auricular extra systole 98%; supra ventricular tachycardia 100%; and the results for other arrhythmias are likewise very good. (Atomindex citation 11:518307)

PATENT-4 227 937 Not available NTIS
Department of Health, Education, and Welfare, Washington, DC.
Additive Composition for Making Dental Materials.
Patent,
Curtis P. Mabie. Filed 23 Jun 76, patented 14 Oct 80, 5p PB81-116618, PAT-APPL-699 202
Supersedes PB-258 392.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Addition of ammonium stabilized colloidal silica, borax and boric acid to the distilled water in which dental porcelain is fired greatly increases the firing range by reducing 'balling' or edge rounding, and flow deformation. Greatly increased machinability and indefinitely prolonged green-biscuit strength is also obtained by the use of the present additive without deleterious effects on the porcelain.

PB81-116386 (Order as PB81-116287, PC **A05**/MF **A01**)
Lanzhou General Hospital (China).
A Screw - Spring Traction Apparatus for Fracture of the Shaft of Femur,
Ge Baofeng, Wang Yong, and Chang Wenzhong. Apr 80, 4p
Included in Chinese Medical Jnl., v93 n4 p275-278 1980.

A traction apparatus for fracture of the shaft of the femur is described. It has the advantages of being easy to operate, suitable for fractures of any part of the femoral shaft, and conducive to continuous traction. Clinical use in 44 cases has been satisfactory.

PB81-121733 PC **A03**/MF **A01**
Utah Univ., Salt Lake City. Div. of Artificial Organs.
A Membrane System to Remove Urea from the Dialyzing Fluid of the Artificial Kidney.
Final rept. 1 Jul 77-31 Oct 79,
Don E. Gregonis, Elias Klein, Stephen Wisniewski, Richard Wendt, and Willem J. Kolff. 9 Oct 80, 27p AK-2-7-2210F
Contract N01-AM-7-2210
See also report dated 15 Mar 78, PB-299 161. Prepared in cooperation with Gulf South Research Inst., New Orleans, LA.

Work presented in this report investigates alternative methods to remove urea from dialysate fluid. The most promising method incorporates an added fluid loop which interfaces with normal dialysate fluid by a urea permeable, ion impermeable membrane dialyzer. In this added loop, called the urea removal loop, is incorporated immobilized urease and a mixed bed ion exchanger. The urea crosses the membrane, is hydrolyzed to ammonium and carbonate (bicarbonate) ions by the urease and the resulting ions are removed by the ion exchanger. The urea removal loop is thus essentially ion free after the ion exchange resin bed. Glucose or other monosacchrides are used to maintain osmotic balance. Simulated hemodialysis experiments demonstrate the removal of substantial amounts of urea from hemodialysate without altering levels of physiologically required electrolytes as pH, sodium, potassium, calcium and magnesium. A discussion of the total requirements of the hemodialysis system is presented.

PB81-123127 PC **A04**/MF **A01**
University of South Florida, Tampa.
Antithrombogenic Surfaces: Platelet-Interface Reactions.
Final rept. 6 Sep 78-5 Sep 79,
R. G. Mason, H. Y. K. Chuang, and S. F. Mohammad. 20 Nov 80, 66p
Contract N01-AM-7-2237
See also report dated 24 Jan 77, PB-273 483.

Trombin adsorption onto Cuprophane surfaces was shown to be not saturable at thrombin concentrations of up to 1 mg/ml and to give adsorption isotherms distinct from those for four other proteins: albumin, fibrinogen, immunoglobulin G, and antithrombin III. Kinetic analyses suggested two types of binding sites with thrombin-Cuprophane apparent dissociation constants (Kd) of 300 nM and 7190 nM respectively. Data from the competitive adsorption of thrombin on Cuprophane in the presence of albumin and immunoglobulin G at both low and high thrombin concentrations and the absence of such types of adsorption of thrombin on PVC support the concept of the presence of these two types of binding sites on Cuprophane. On the other hand, thrombin-poly(vinyl chloride) interaction resulted in a Langmuir type adsorption. Immunoglobulin G shows higher affinity for poly(vinyl chloride) (Kd=35 nM) than do the other four proteins (KD=300-900 nM). A hypothesis that multiple types of binding sites that are specific for certain plasma proteins may exist on various artificial surfaces is proposed.

PB81-920900 Standing Order
Food and Drug Administration, Rockville, MD.
FDA Compliance Program Guidance Manual. Section V. Medical Devices. Updates.
Irregular repts.
1980, approx. 4 issues
Paper copy available on Standing Order, Deposit Account required. North American Continent price $41.00/year; all others write for quote. Single copies also available in paper copy only, price based on page count. Basic report available as PB80-920999.

The standing order allows one to obtain updates to Section V of the Compliance Program Guidance Manual which provides plans and instructions to Field operations which are surveillance and/or compliance oriented and provide needed direction from Headquarters Offices and Bureaus in accomplishing FDA's regulatory obligations for medical devices. This section also includes the concept to the Manual and miscellaneous material relating to compliance functions.

6M. Microbiology:

AD-A090 990/3 PC **A02**/MF **A01**
Walter Reed Army Inst. of Research, Washington, DC.
An Improved Apparatus for Safely Feeding Fleas (Siphonaptera) in Plague Studies,
Michael W. Hastriter, David M. Robinson, and Dan C. Cavanaugh. 1980, 3p
Pub. in Jnl. of Medical Entomology, v17 n4 p387-388, 31 Jul 80.

No abstract available.

AD-A091 394/7 Not available NTIS
Wright State Univ., Dayton, OH. Dept. of Biological Sciences.
Induction of Plasmid-Borne Mercuric Ion Resistance by Streptomycin in Pseudomonas aeruginosa,
Peter H. Calcott. 29 Apr 80, 4p ARO-15525.7-L
Grant DAAG29-78-G-0084
Availability: Pub. in FEMS Microbiology Letters n8 p211-213 1980 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A091 395/4 Not available NTIS
Army Medical Research Inst. of Infectious Diseases, Frederick, MD.
In Vitro Studies of Interaction of Rickettsia and Macrophages: Effect of Ultraviolet Light on Coxiella burnetii Inactivation and Macrophage Enzymes,
James S. Little, Richard A. Kishimoto, and Peter G. Canonico. 1980, 5p
Availability: Pub. in Infection and Immunity, v27 n3 p837-841 Mar 80 (No copies furnished by DTIC/NTIS).

No abstract available.

PB81-125684 PC **A02**/MF **A01**
Environmental Research Lab., Athens, GA.
Effects of Sediment Sorption on Microbial Degradation of Toxic Substances.
Journal article,
William C. Steen, Doris F. Paris, and George L. Baughman. 1980, 8p EPA-600/J-80-132
Pub. in Contaminants and Sediments, v1 p477-482 1980.

The degradation of compounds at concentrations normally encountered in environmental samples can be adequately described by a second-order rate expression, which accounts for sorption in sediment:water systems. ATP is used as a measure of population size. It will be shown that sorption of toxics to suspended sediments rendered the compound unavailable for degradation in the absorbed state. Further testing of this kinetic expression is needed, however, for broader classes of compounds having wider ranges of sorptive properties.

PB81-125700 PC **A02**/MF **A01**
Environmental Research Lab., Athens, GA.
Quantitative Expression of Biotransformation Rate.
Journal article,
George L. Baughman, Doris F. Paris, and William C. Steen. 1980, 9p EPA-600/J-80-120
Pub. in Biotransformation and Fate of Chemicals in the Aquatic Environment, American Society for Microbiology, Washington, DC., p105-111 1980.

Methodologies and approaches to the study of microbial transformation of organic compounds in natural waters and sediments are outlined. Tentative evidence is given to demonstrate that use of rate constants is a reasonable approach. Application of second-order kinetics incorporating the effects of organic compound concentration, bacterial concentration, and sorption by suspended sediment is made to natural systems.

PB81-127938 PC **A02**
Florida State Univ., Tallahassee. Dept. of Biological Science.
Effects of Grazing by Estuarine Gammaridean Amphipods on the Microbiota of Allochthonous Detritus,
Susan J. Morrison, and David C. White. Sep 80, 14p NOAA-80101708
Grant NOAA-04-7-158-4406
Pub. in Applied and Environmental Microbiology, v40 n3 p659-671 Sep 80. Also pub. as Tallahassee, Sopchoppy, and Gulf Coast Marine Biological Association, FL. contribution no. 133.

The response of detrital microorganisms to being grazed by gammaridean amphipods was examined using several parameters of microbial biomass, activity, and community composition. Biomass was determined by ATP and by light phosphate. Alkaline phosphatase enzyme activity and oxygen utilization served as general indicators of metabolic activity. Changes in the microbial density and composition were also followed by scanning electron microscopy (SEM). Degrading oak leaves, which are abundant in Apalachicola Bay and estuarine gammaridean amphipods were used for the study. Many of these small crustaceans are epifaunal dwellers often associated with plant matter and are often found in substantial numbers on degrading hardwood leaves. They have been shown by SEM and radioisotope tracer studies to remove, ingest, and assimilate microorganisms from oak detritus. The biochemical data supported scanning electron microscopy observations of a shift as the grazing proceeded from a bacterial/fungal community to one dominated by bacteria.

6O. Pharmacology

AD-A090 879/8 Not available NTIS
Duke Univ., Durham, NC. Paul M. Gross Chemical Lab.
Synthesis and Biological Activity of Boron Analogues of the alpha-Amino Acids and Related Compounds,
B. F. Spielvogel. 1980, 13p ARO-15007.11-C
Grants DAAG29-77-G-0099, DAAG29-78-G-0055
Availability: Pub. in Boron Chemistry, p119-129 1980 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A090 890/5 PC **A02**/MF **A01**
Walter Reed Army Inst. of Research, Washington, DC.
Activity of 2-Acetylpyridine Thiosemicarbazones Against Trypanosoma rhodesiense In Vitro.
Final rept.,
Robert A. Casero, Jr., Daniel L. Klayman, George E. Childs, John P. Scovill, and Robert F. DesJardins. 1980, 8p
Pub. in Antimicrobial Agents and Chemotherapy, v18 n2 p317-322 Aug 80.

No abstract available.

AD-A090 926/7 Not available NTIS
Army Medical Research Inst. of Infectious Diseases, Frederick, MD.
The Guinea Pig as a Model for Isoniazid-Induced Reactions,
Gregory B. Heisey, Howard C. Hughes, C. Max Lang, and Harry Rozmiarek. 1979, 9p
Presented at the Annual Session of the American Association for Laboratory Animal Science (30th) 16-21 Sep 79, Atlanta.
Availability: Pub. in Laboratory Animal Science, v30 n1 p42-50 Feb 80 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A090 993/7 PC **A02**/MF **A01**
Walter Reed Army Inst. of Research, Washington, DC.
IgA-Dependent Monocyte-Mediated Antibacterial Activity,
George H. Lowell, Lynette F. Smith, J. M. Griffiss, and Brenda L. Brandt. 31 Mar 80, 8p
Pub. in The Jnl. of Experimental Medicine, v152 p452-457 1980.

No abstract available.

INIS-mf-5673 PC **A05**/MF **A01**
Ministerstvo Zdravookhraneniya SSSR, Moscow.
Summaries of Reports of 1. All-Union Scientific-Technical Conference on Medical Production Radiation Sterilization. Summaries of Reports.
1978, 94p CONF-7810242-(Sum.)
In Russian.All-union scientific--technical conference on medical production radiation sterilization, Moscow, USSR, 24 Oct 1978.
U.S. Sales Only.

Individual papers in scope were abstracted. (ERA citation 05:036192)

PB81-923700 Subscription
Food and Drug Administration, Rockville, MD. Bureau of Drugs.
FDA Drug and Device Approvals.
Monthly repts.
1980, 12 issues
Paper copy available on subscription, North American Continent price $50.00/year; single copy price PC$5.00; all others write for quote.

The publication lists the New Drug Applications (NDA's), Antibiotic Form 5's and 6's, Abbreviated New Drug Applications (ANDA's) approved during the previous month. It also contains New Animal Drug Applications (NADA's), Biologic Licenses and Premarketing Device Application Approvals. Supplemental Application approvals are also listed.

6P. Physiology

AD-A090 889/7 PC **A02**/MF **A01**
Walter Reed Army Inst. of Research, Washington, DC.
Cardiac Contractility and the Spinal Sympathetic Neuron,
Alan I. Faden, and Thomas P. Jacobs. 1980, 13p
Pub. in Neurological Research, v1 n3 p227-237 1980.

No abstract available.

AD-A090 927/5 Not available NTIS
Army Medical Research Inst. of Infectious Diseases, Frederick, MD.
Electrocardiograms of Nine Species of Nonhuman Primates Sedated with Ketamine,
Janet C. Gonder, Elizabeth A. Gard, and Nathaniel E. Lott, III. 11 Jun 79, 4p
Availability: Pub. in American Jnl. of Veterinary Research, v41 n6 p972-975 1980 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A090 929/1 Not available NTIS
Defence Research Establishment Valcartier (Quebec).
Recognition of Reflection and Illumination Edges by the Human Visual System,
J. F. Boulter. 9 Nov 79, 4p DRB-REPRINT-4252
Availability: Pub. in Applied Optics, v19 n12 p2077-2079, 15 Jun 80 (No copies furnished by DTIC).

No abstract available.

AD-A090 978/8 PC **A02**/MF **A01**
Naval Aerospace Medical Research Lab., Pensacola, FL.
The Vestibulo-Ocular Reflex in Man during Voluntary Head Oscillation under Three Visual Conditions.
Interim rept.,
Ralph M. Jell, Fred E. Guedry, Jr., and W. Carroll Hixson. 15 Jul 80, 25p Rept no. NAMRL-1271

The vestibulo-ocular reflex (VOR) generated by voluntary head movements keyed to a tone varying sinusoidally in pitch was studied in 13 men. Modulation of pitch at frequencies ranging from 0.1 to 5.0 Hz yielded systematic variation in head movement frequencies, although at higher frequencies head frequencies fell below requested frequencies. Three conditions of visual stimulation were used. When an Earth-fixed visual target was visible, VOR gain (maximum eye velocity divided by maximum head velocity) in each half cycle was slightly but significantly greater than VOR gain in

darkness at all frequencies except 0.1 Hz. With a head-fixed target, VOR gain was substantially less than VOR gain in darkness at all requested frequencies below 2.0 Hz. The finding that visual suppression becomes ineffective at frequencies above 1.0 Hz parallels results obtained in other laboratories during passive whole-body oscillation. Results indicate that the procedures appear feasible for further evaluation as part of a clinical test battery. (Author)

AD-A090 994/5 PC **A02**/MF **A01**
Walter Reed Army Inst. of Research, Washington, DC.
The Platelet of the Newborn Infant - Adenine Nucleotide Metabolism and Release,
June M. Whaun, and Paul Lievaart. 12 Jun 79, 8p
Pub. in Thrombosis and Haemostasis, v43 n2 p99-103, 18 Jun 80.

No abstract available.

AD-A091 195/8 PC **A02**/MF **A01**
Armed Forces Radiobiology Research Inst., Bethesda, MD.
Interaction of Chemotactic Factors with Human Polymorphonuclear Leukocytes: Studies Using a Membrane Potential-Sensitive Cyanine Dye,
Bruce E. Seligmann, Elaine K. Gallin, David L. Martin, William Shain, and John I. Gallin. 23 May 79, 19p Rept no. AFRRI-SR80-12
Pub. in Jnl. of Membrane Biology, v52 p257-272 1980.

No abstract available.

AD-A091 368/1 Not available NTIS
Kansas Univ Lawrence Dept of Human Development
Effects of L-Glutamic Acid on Synaptosomal and Synaptic Membrane Na+ Fluxes and (Na+-K+)-ATPase,
Hsuan H. Chang, and Elias K. Michaelis. 26 Sep 79, 8p ARO-16583.2-L
Contract DAAG29-79-C-0156, Grant PHS-RR-50706
Availability: Pub. in Jnl. of Biological Chemistry, v255 n6 p2411-2417, 25 Mar 80 (No copies furnished by DTIC/NTIS).

No abstract available.

INIS-mf-5587 PC **A05**/MF **A01**
Giessen Univ. (Germany, F.R.). Fachbereich Humanmedizin.
Collagen Induced Aggregation of Platelets and Release of exp 14 C Serotonin from Platelets Depending on Temperature and pH During in Vitro Storage of Platelets.
Diss. (M.D.),
J. Krause. 1978, 84p
In German.
U.S. Sales Only.

The paper investigates collagen-induced platelet aggregation and exp 14 C serotonin release in dependence of age, temperature, and pH value during the storage of the conserved platelets. The optimum pH (with adjusted CO sub 2 /air mixture) for platelet storage is found to be pH 6.9. The optimum temperature for platelet storage is 4-8 exp 0 C. After 12, 24, or 48 hours of storage at pH 6.9 and 4-8 exp 0 C and subsequent heating of the platelet-rich plasma to 37 exp 0 C for 30 minutes, the values determined for collagen-induced platelet aggregation and exp 14 C serotonin release rarely differed from the initial values before storage. Cold-induced spontaneous platelet aggregation and serotonin release of the platelets stored at 4-8 exp 0 C can be avoided by 30-60 minutes preincubation of the platelets at 37 exp 0 C before transfusions. The in vitro findings for collagen-induced platelet aggregation and exp 14 C serotonin release indicate that platelet storage for 24-48 hours at pH 6.9 and 4-8 exp 0 C may be permissible also for clinical purposes. The problem remains open whether the clinical effect of these platelets is still sufficient after 48 hours of storage, but literature findings suggest that this may well be the case. (Atomindex citation 11:517451)

PB81-114811 PC **A03**/MF **A01**
Unilever Research Lab., Vlaardingen (Netherlands).
Essential Fatty Acid Requirements, Especially in Relation to Prostaglandin Biosynthesis,
A. J. Vergroesen. 1979, 27p

With respect to the optimal concentration of linoleic acid in the diet to achieve the above summarized effects no clear advice can be given. On the basis of studies published so far it seems justifiable to conclude that the highest concentrations are required to normalize LDL cholesterol levels in blood for which 16-18 en percent of linoleic acid is calculated to be necessary (37, 38) for diets with circa 40 en percent of total fat and 300-400 mg of cholesterol. At higher cholesterol intakes or at a higher total fat concentration more linoleic acid will have to be consumed; the reverse is probably also true. A low-fat high-carbohydrate diet is normally low in saturated fatty acids and in practice requires a substantial substitution of vegetable protein sources for animal protein in order to achieve a low dietary fat concentration. Most animal protein products such as cheese and meat are high in saturated fat content.

PB81-117012 PC **A05**/MF **A01**
Professional Staff Association of LAC/USC Medical Center, Los Angeles, CA.
Fibroprotein Networks of the Pulmonary Alveolar Wall.
Final rept. Apr 76-Aug 79,
Sidney S. Sobin. Oct 80, 90p NIH-N01-HR-62910-1F
Contract N01-HR-6-2910
See also report dated Mar 78, PB-278 520.

This is a contract proposal to investigate the fibroproteins, collagen and elastin, of the interalveolar wall of the postmortem human lung as the change with age. Both direct microscopy and digital image processing (computer) approaches were used. From direct microscopy we extended our knowledge of the geometry of these connective tissues, demonstrated that the unchanged VSTR with age was consistent with an isotropic behavior of the interalveolar wall and that as alveolar posts increase with age, they gradually expand the collagen ring, tear and become pores. Digital image processing resulted in a technique for compressing three dimensional images into a sharp two dimensional image which in turn provided the basis for analysis of these images. Texture (pattern), fiber width and alveolar dimension were investigated. Textural changes with age were quantifiable; fiber width, elastin, increased with age, as did alveolar dimension.

6Q. Protective Equipment

AD-A091 175/0 PC **A02**/MF **A01**
Aeronautical Research Labs., Melbourne (Australia).
Weathering Tests on Protective Helmets Approved to Australian Standard as 1698 (For Vehicle Users).
Interim rept. no. 2,
S. R. Sarrailhe. Jul 80, 14p Rept no. ARL/STRUC-TM-320

This report describes the results of impact tests on helmets after seven months exposure to the weather. No deterioration in performance was detected. The tests were part of an investigation which is planned to continue for three years with further tests to be carried out one year, eighteen months, two years and three years after commencement of the exposure.

6R. Radiobiology

AD-A090 822/8 PC **A04**/MF **A01**
Technology, Inc., San Antonio, TX. Life Sciences Div.
Low Level Infrared Irradiance Ocular Effects.
Final rept. 1 Sep 77-30 Nov 78,
William H. Bowie. Nov 78, 55p
Contract DAMD17-77-C-7052

The ocular lenses of checker rabbits were exposed to infrared radiation at 1064 nm. Exposures were made with a cw laser with exposure times varying up to 3000 seconds. Exposures were repeated at weekly intervals with power levels chosen such that no retinal lesions were produced. Documentation of retinal and lenticular effects was provided by fundus and slit lamp photography. Opacities were observed on the posterior poles of the rabbit lenses. Following the exposure sequences, the lenses were removed and the capsule, cortex and nucleus separated. The components were homogenized and subjected to polyacrylimide gel electrophoresis. In addition, measurements of intralenticular light scattering and posterior pole opacity size were made. However, the cortex of irradiated lenses contained more insoluble material than did the cortex of non-irradiated lenses. Opacity size and density may have been a function of both irradiation and anesthesia usage.

AD-A090 986/1 PC **A02**/MF **A01**
Foreign Technology Div., Wright-Patterson AFB, OH.
The Study of Transparent Plastics Used as Laser Protection,
Hua Xiantong, Huang Meiyu, Qian Chunqin, and Pan Ang. 7 Oct 80, 12p Rept no. FTD-ID(RS)T-1772-80
Edited trans. of Laser Journal (China) n3 p52-57 1979, by Randy Dorsey.

No abstract available.

AD-A090 996/0 PC **A02**/MF **A01**
School of Aerospace Medicine, Brooks AFB, TX.
Raman Spectra of Normal and Ultraviolet-Induced Cataractous Rabbit Lens.
Final rept. Sep 77-Sep 78,
Dwaine M. Thomas, and Kenneth L. Schepler. 4 Apr 79, 11p Rept no. SAM-TR-79-299
Pub. in Investigative Opthalmology and Visual Science, v19 n8 p904-912 Aug 80.

No abstract available.

AD-A091 047/1 PC **A03**/MF **A01**
Wayne State Univ Detroit MI Dept of Electrical and Computer Engineering
Mechanisms of Microwave-Induced Blood-Brain Barrier Alterations.
Final rept. 1 Apr 78-31 Aug 80,
James C. Lin. Sep 80, 31p Rept no. BES-4
Contract N00014-78-C-0353

This investigation was designed to study the mechanisms of interaction between microwaves and the blood-brain barrier and was aimed at correlating changes of blood-brain barrier permeability with the quantity and distribution of absorbed microwave energy inside the brain of adult Wistar rats under sodium pentobarbital anesthesia. Through use of thermographic methods and a direct-contact applicator at the animal's head, the pattern of absorbed microwave energy was determined. Indwelling catheters were placed in the femoral vein. Evans blue in isotonic saline were used as a visual indicator of barrier permeation. Irradiation with pulsed 2450-MHz microwaves for 20 min at average power densities of 0.5 to 2600 mW/squared, which resulted in average specific absorption rates (SARs) of 0.04, to 200 mW/g in the brain, did not produce staining, except in regions that normally are highly permeable. When the incident power density was increased to 3000 mW/squared (SAR of 240 mW/g), extravasation of Evans blue could be seen in the cortex, hippocampus and midbrain.

AD-A091 199/0 PC **A02**/MF **A01**
Armed Forces Radiobiology Research Inst., Bethesda, MD.
Reduction in Cyclic Nucleotide Levels in the Brain after a High Dose of Ionizing Radiation.
Scientific rept.,
Walter A. Hunt, and Thomas K. Dalton. 29 Oct 79, 10p Rept no. AFRRI-SR80-16
Pub. in Radiation Research, v83 p210-215 1980.

No abstract available.

AECL-6586 PC **A04**/MF **A01**
Atomic Energy of Canada Ltd., Chalk River (Ontario). Chalk River Nuclear Labs.

Progress Report, Biology and Health Physics Division, 1 April to 30 June 1979.
Aug 79, 67p PR-B-122
U.S. Sales Only.

Results are reported for research into the areas of dosimetry, monitoring, environmental radiation effects, waste management and tumour induction in mammals. (Atomindex citation 11:523528)

CEGB-RD/B/N-4668 PC **A04**/MF **A01**
Central Electricity Generating Board, Berkeley (England). Berkeley Nuclear Labs.
Method for Assessing the Annual Dose to the Most Exposed Individual from Tritium and exp 14 C Reactor Discharges to Atmosphere.
S. Nair. Oct 79, 67p
U.S. Sales Only.

A method is described for assessing the annual dose to the most exposed individual from routine releases of tritium and exp 14 C to the atmosphere during normal reactor operations. A detailed assessment has been made of the resulting equilibrium contamination levels in a range of foodstuffs typical of an average UK diet and of the annual doses resulting from a chronic intake of tritium and exp 14 C via inhalation, ingestion and, additionally, in the case of tritium, via skin absorption. Equilibrium annual doses from the global circulation of tritium and exp 14 C have also been calculated. Upper limits to the effective annual dose-equivalents to the most exposed individual were found to be 0.6 rem.yr exp -1 and 100 rem.yr exp -1 per Ci.yr exp -1 release of tritium and exp 14 C respectively, with the ingestion pathway contributing significantly to the overall exposure. The most exposed individual was found to be a Reference 10 year old child. The methods outlined for calculating the ingestion dose from tritium and exp 14 C releases hav been incorporated into the more generally applicable code FOODDOSE. The code may be used to make more realistic dose calculations to the individuals based on site-specific surveys of variables such as local meteorology, local diet and local land use for agriculture, which may lead to doses smaller than the upper limit values quoted by factors of 20 and 200 for tritium and exp 14 C respectively. (Atomindex citation 11:525430)

FOA-C-40060 PC **A12**/MF **A01**
Foersvarets Forskningsanstalt, Stockholm (Sweden).
Dose Conversion Factors for External Photon Radiation.
L. Svensson. Oct 79, 256p
U.S. Sales Only.

Dose conversion factors for radionuclides have been computed and tabulated for two situations: photon doses resulting from immersion in contaminated air, and exposure to a contaminated land surface. Computed dose conversion factors relates absorbed dose rate in human tissue to activity concentration. Tabulated dose conversion factors includes contributions from naturally occuring radionuclides as well as manmade radionuclides: activation products, fission products, actinides. (Atomindex citation 11:525438)

INKA-Conf-79-395-001 PC **A02**/MF **A01**
Auburn Univ., AL. Dept. of Chemical Engineering.
Biological Effects of Low-Dose Irradiation.
F. E. Stieve. 1979, 21p
In German.
U.S. Sales Only.

For a long time, radiation, biological research concentrated on the diagnosis and the effect chains to be taken into consideration in the case of acute and chronic radiation effects due to intensive irradiation. Approximately at the beginning of the Thirties, the research results of the geneticist Mueller and the radiation-biologists Oliver and Timofeef-Ressovsky brought a fundamental change in the way of looking at things in radiation biology. From the results then obtained it can be deduced that even the smallest quantities of radiation can cause effects. Basically, two processes leading to different radiation reactions have to be recognized: 1) A change in the genetical code, especially by direct irradiation of the nucleus. The effects thus arising are called stochastic effects. 2) A change of the cell in total by inactivation of the cell division or by cell death. These are called non-stochastic effects. Here, a threshold dose is existent. In these cases, the degree of the effects depends on the quantity of the dose. Therefore, the stochastic effects are paid special attention when determining radiation effects with low doses. Here, the emphasis of the research was moved from the genetic effects to the generation of somatic effects, especially the generation of malign neoformations and the shortening of the life connected with them. In the generation of malign neoformations by ionising radiation, probably only the transformation of a single cell is necessary, however only then when ionising radiation is absorbed in the nucleus several times (multi-hit theory). This leads to the assumption that the induction of malignant neoformations possesses a linear quadratic function, at least in the region of medium doses. (Atomindex citation 11:517225)

LBL-11268 PC **A03**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
BEIR-III Controverly.
J. I. Fabrikant. Jun 80, 27p CONF-8006118-1
Contract W-7405-ENG-48
28. annual scientific meeting of the radiation research society, New Orleans, LA, USA, 1 Jun 1980.

How certain of the areas addressed by the Committee on the Biological Effects of Ionizing Radiation (BEIR) have attempted to deal with the scientific basis for establishing appropriate radiation protection guides is discussed, and what effect this may have on decision-making for the regulation of societal activities concerned with the health effects in human populations exposed to low-level radiation. (ERA citation 05:035535)

NUREG/CR-1669 PC **A03**/MF **A01**
Lovelace Biomedical and Environmental Research Inst., Albuquerque, NM. Inhalation Toxicology Research Inst.
Biological Characterization of Radiation Exposure and Dose Estimates for Inhaled Uranium Milling Effluents.
Annual progress rept. 1 Mar 79-31 Mar 80,
A. F. Eidson. Oct 80, 40p LMF-76

Comparison of chemical properties and the biological behaviors of yellowcake are made to identify important properties that influence organ distribution patterns. These studies will facilitate calculations of organ doses for specific exposures, health risk estimates and will identify important bioassay procedures to improve evaluations of human exposures. Sampling of airborne yellowcake at two uranium mills showed that aerosols were heterogeneous and contained approx. 50% of the airborne uranium in particles greater than 12 micrometers MMAD. Particle size distribution varied with time. The results showed that significant amounts of uranium would deposit in the nasopharyngeal region of the respiratory tract if inhaled. Experiments to develop an easily applied in vitro test that will reproduce yellowcake solubility in vivo are described. Comparisons of solvents, methods and conditions were made and important variables are described. Quantitative infrared analysis of yellowcake samples showed that ammonium diuranate content varied from 12 to 82% of yellowcake from four mills and from 12 to 45% of lots from one mill. Fluorometric techniques for uranium analysis of biological samples at a detection limit of 4 micrograms U per aliquot are described. A description of the exposure phase of inhalation studies of rats exposed to soluble and insoluble yellowcake aerosols is given.

PB81-113359 PC **A09**/MF **A01**
Radiation Policy Council, Washington, DC.
Progress Report and Preliminary 1981-83 Agenda of the United States Radiation Policy Council.
Sep 80, 182p RPC-80-001

The U.S. Radiation Policy Council is responsible for coordinating the formulation and implementation o Federal Policy relating to radiation protection. In carrying out this very broad and basic mandate, the RPC has been directed to: Advise on the formulation of broad radiation protection policies; monitor the implementation of Federal policies; Help resolve conflicts in jurisdiction among Federal agencies; Recommend corrective legislation, if needed; ensure effective liaison with the States and the Congress; and Serve as a forum for public participation and comment. The RPC was established by Executive Order Number 12194 in February 1980. The Council was created to coordinate the formulation and implementation of Federal policies relating to radiation protection. This report summarizes the first 7 months the Council has been in operation, its activities, and decisions through September 1980.

PB81-921000 Standing Order
Food and Drug Administration, Rockville, MD.
FDA Compliance Program Guidance Manual. Section VI. Radiological Health. Updates.
Irregular repts.
1980, approx. 4 issues
Paper copy available on Standing Order, Deposit Account required. North American Continent price $44.00/year; all others write for quote. Single copies also available in paper copy only, price based on page count. Basic report available as PB80-921099.

The standing order allows one to obtain updates to Section VI of the Compliance Program Guidance Manual which provides plans and instructions to Field operations which are surveillance and/or compliance oriented and provide needed direction from Headquarters Offices and Bureaus in accomplishing FDA's regulatory obligations for those products monitored for radiation. This section also includes the concept to the Manual and miscellaneous material relating to compliance functions.

PNL-SA-8438 PC **A03**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Evaluation of Several Methods for Assessing the Effects of Occupational Exposure to Radiation.
E. S. Gilbert. May 80, 28p CONF-800820-11
Contract AC06-76RL01830
American Statistical Society meeting, Houston, TX, USA, 11 Aug 1980.

The evaluation of health effects in populations occupationally exposed to low-level ionizing radiation is a matter of considerable current controversy. The analysis of data on such exposures presents a variety of problems resulting from the time dependent nature of the exposure data, certain selective biases found in working populations, and particularly limits imposed by the size of the populations, and the magnitudes of exposures received. In this paper, several methods of analysis are presented and evaluated using data from the Hanford plant for illustration. Questions of interest include whether or not to utilize an external control, and how to handle the highly skewed exposure data most effectively. Expressions for the power of various procedures are used not only to compare methods but also to evaluate the potential for detecting effects in occupationally exposed populations. (ERA citation 05:035538)

UR-3490-1900 PC **A07**/MF **A01**
Rochester Univ., NY. Dept. of Radiation Biology and Biophysics.
Effect of Ionizing Radiations on Connective Tissue.
K. I. Altman, and G. B. Gerber. 1980, 137p
Contract AC02-76EV03490

The effects of ionizing radiations on connective tissue in lung, heart, vasculature, kidney, skin, and skeletal tissues are reviewed. Special emphasis is given to the effect of ionizing radiations on vasculo-connective tissue and fibrotic changes following radiation-induced injury to organs and tissues. In order to put the subject matter in proper prospective, the general biochemistry, physiology, and pathology of connective tissue is reviewed briefly together with the participation of connective tissue in disease. The review closes with an assessment of future problems and an enumeration and discussion of important, as yet unanswered questions. (ERA citation 05:035541)

6S. Stress Physiology

AD-A090 995/2 PC **A02**/MF **A01**
School of Aerospace Medicine, Brooks AFB, TX.
Renal Blood Flow in Miniature Swine during +Gz Stress and Anti-G Suit Inflation,
M. Harold Laughlin, W. M. Witt, and Robert N. Whittaker, Jr. 5 Nov 79, 7p Rept no. SAM-TR-79-407
Pub. in Jnl. of Applied Physiology: Respiratory, Environmental, Exercise Physiology, v49 n3 p471-475 1980.

No abstract available.

N81-10696/5 PC **A02**/MF**A01**E
European Space Agency, Paris (France).
The Influence of Hyperbaric Environment in Combination with Workload and Confinement on Human Information Processing.
K. M. Goerters. Dec 79, 16p ESA-TT-567, DFVLR-FB-78-12
Transl. into English from 'Die Beeinflussung der Geistigen Konzentrationsfaehigkeit durch Ueberdruck Unter Berucksichtigung der Zusaetzlichen Belastungsfaktoren Arbeitsbeanspruchung U. Isolation', Dfvlr, Bad Godesberg (Germany, F.R.). Report Dfvlr-FB-78-12, Jul. 1978. Original Report in German Previously Announced as N79-30926. Original German Report Available from Dfvlr, Cologne Dm 8,20.

A test requiring perceptual speed, memory, and numerical ability was given to subjects before and during working conditions with varying degrees of work load, confinement, and ambient pressure. Results demonstrate that high workload and confinement for several days do not lower the test scores, but rising partial pressure of nitrogen results in performance decrements. These decrements are already present at an N2 partial pressure of 3 bar abs.

PB81-126781 PC **A02**
Wisconsin Univ.-Madison.
Responses of Fetal Sheep to Simulated No-Decompression Dives,
Michael K. Stock, Edward H. Lanphier, Debra F. Anderson, Lawrence C. Anderson, and Terrance M. Phernetton. 1980, 8p WIS-SG-80-713, NOAA-80102203
Pub. in American Physiological Society, p776-780 1980.

The effect of simulated standard no-decompression dives to 60 and 100 ft of seawater was tested in 12 near term sheep carrying 16 fetuses. In the immediate postdive period there were no significant changes in fetal blood pressure or fetal placental or renal blood flow, but the maternal blood pressure was elevated and the maternal placental blood flow was depressed. Six surgically prepared fetuses were dived to 100 ft. Five died within 20 min of ascent and the sixth suffered cardiac arrhythmia and hypotension. At autopsy all fetuses were observed to have massive bubbling in the arterial system and heart. Five fetuses were dived to 100 ft without surgery. Two were alive 3 h later and no bubbles were present at autopsy, and three were born alive at term. With the 60-ft dives, three fetuses were subjected to surgery and all suffered massive bubbling. Two fetuses were dived to 60 ft without surgery; one was alive after 3 hr and the other was born alive at term. It is concluded that surgery and monitoring result in the formation of postdive gas bubbles that would not otherwise appear.

6T. Toxicology

AD-A090 900/2 PC **A02**/MF **A01**
Walter Reed Army Inst. of Research, Washington, DC.
Quantitative Microtiter Cytotoxicity Assay For Shigella Toxin,
Mary K. Gentry, and Joel M. Dalrymple. 1980, 8p
Pub. in Jnl. of Clinical Microbiology, v12 n3 p361-366 Sep 80.

No abstract available.

AD-A090 902/8 PC **A02**/MF **A01**
Walter Reed Army Inst. of Research, Washington, DC.
Inhibition of Protein Synthesis by Shiga Toxin: Activation of the Toxin and Inhibition of Peptide Elongation,
J. Edward Brown, Michael A. Ussery, Stephen H. Leppla, and Sara W. Rothman. 28 May 80, 6p
Pub. in FEBS Letters, v117 n1 p84-88 Aug 80.

No abstract available.

AD-A090 912/7 Not available NTIS
Army Medical Research Inst. of Infectious Diseases, Frederick, MD.
Modification of Lethality Induced by Staphylococcal Enterotoxin B in Dutch Rabbits,
C. T. Liu, and R. P. Sanders. 4 Jun 79, 6p
Availability: Pub. in American Jnl. of Veterinary Research, v41 n3 p399-404 Mar 80 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A091 311/1 PC **A06**/MF **A01**
Science and Education Administration Fort Collins CO Agricultural Research
Plant Toxicity and Soil Transformations of Soil Incorporated Sulfur Compounds.
Final rept. Aug 77-Nov 79,
W. D. Guenzi, W. E. Beard, R. A. Bowman, and S. R. Olsen. Nov 79, 106p

Research was conducted to evaluate p-chlorophenyl methyl sulfide, sulfoxide, and sulfone in relation to plant toxicity, chemical uptake by plants from soil, translocation of foliar applied chemicals, and degradation in soil. These three chemicals are closely related and differ only in their oxidation state. Radioactive chemicals were used in the main experiments with C14 being uniformly incorporated in the ring structure. Measurements of degradation, uptake, and translocation were made from total activity measurements of dry combusted soil and plant samples. In addition, the translocation of foliar applied diisopropyl methylphosphonate (DIMP) was determined in corn and sugarbeets. (Author)

CONF-800601-3 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Problems and Solutions in the Estimation of Genetic Risks from Radiation and Chemicals.
W. L. Russell. 1980, 20p
Contract W-7405-ENG-26
13. Rochester international conference on environmental toxicity--measurement of risks, Rochester, NY, USA, 2 Jun 1980.

Extensive investigations with mice on the effects of various physical and biological factors, such as dose rate, sex and cell stage, on radiation-induced mutation have provided an evaluation of the genetics hazards of radiation in man. The mutational results obtained in both sexes with progressive lowering of the radiation dose rate have permitted estimation of the mutation frequency expected under the low-level radiation conditions of most human exposure. Supplementing the studies on mutation frequency are investigations on the phenotypic effects of mutations in mice, particularly anatomical disorders of the skeleton, which allow an estimation of the degree of human handicap associated with the occurrence of parallel defects in man. Estimation of the genetic risk from chemical mutagens is much more difficult, and the research is much less advanced. Results on transmitted mutations in mice indicate a poor correlation with mutation induction in non-mammalian organisms. (ERA citation 05:035540)

DOE/EV/03140-5 PC **A02**/MF **A01**
Connecticut Univ. Health Center, Farmington. School of Medicine.
Toxicology and Metabolism of Nickel Compounds. Progress Report, December 1, 1979-November 30, 1980.
F. W. Sunderman, Jr. 15 Aug 80, 15p
Contract AS02-76EV03140

The toxicology and metabolism of nickel compounds (e.g., NiCl sub 2 , alpha Ni sub 3 S sub 2 , and Ni(CO) sub 4) were investigated in rats and hamsters. (ERA citation 05:037234)

LMF-69 PC **A99**/MF **A01**
Lovelace Biomedical and Environmental Research Inst., Albuquerque, NM.
Inhalation Toxicology Research Institute. Annual Report, October 1, 1978-September 30, 1979.
R. F. Henderson, J. H. Diel, and B. S. Martinez. Dec 79, 742p
Contract AC04-76EV01013

Research information is given by the annual report from the Inhalation Toxicology Research Institute with abstracts for each of the 109 papers. Major sections of interest are nuclear energy toxicology, solar energy toxicology, diesel technology toxicology, coal technology toxicology, and conservation technology toxicology. Also included are seven appendices covering publications of technical reports and publications in open literature, abstracts publications in the open literature, seminars presented by visiting scientists and presentations before scientific meetings, organization of the Inhalation Toxicology Research Institute, and the status of experiments using beagle dogs. (ERA citation 05:035543)

PB81-121170 PC **A02**/MF **A01**
Battelle Columbus Toxicology Program Office, Vienna, VA.
Toxicity of Misonidazole (NSC-261,037) Given Orally or Intravenously to Dogs. Amendment to Report No. MRI-KC-PT-3899-80-23. Subject: In Vitro Analysis of Dosing Preparation.
26 Aug 80, 11p
Contract N01-CM-4-3746
Prepared by Midwest Research Inst., Kansas City, MO. Pharmacology and Toxicology. See also report dated 19 May 80, PB81-121188.

The authors have previously submitted three reports on the oral and intravenous toxicity of desmethylmisonidazole (NSC261,036) and misonidazole (NSC-261,037), specifically, MRI-KC-PT-3899-80-22 on desmethylmisonidazole in dogs, MRI-KC-PTR-3899-80-23 on misonidazole in dogs, and MRI-KC-PT-3899-80-24 on both compounds in rats. This additional study consists of in vitro (chemical) analysis of the various dosing mixtures prepared for those toxicity studies.

PB81-124836 PC **A06**/MF **A01**
National Cancer Inst., Bethesda, MD. Carcinogenesis Testing Program.
Bioassay of a Mixture of 1, 2, 3, 6, 7, 8-Hexachlorodibenzo-p-Dioxin and 1, 2, 3, 7, 8, 9-Hexachlorodibenzo-p-Dioxin (Dermal Study) for Possible Carcinogenicity.
Technical rept.
Aug 80, 108p DHHS/PUB/NIH-80-1758, NCI-CG-TR-202, NTP-80-13
Portions of this document are not fully legible.

A bioassay of a mixture of 1,2,3,6,7,8- and 1,2,3,7,8,9,-hexachlorodibenzo-p-dioxins (HCDD) for possible carcinogenicity was conducted by dermal application of a suspension of this substance to Swiss-Webster mice. HCDD (0.01 micrograms) suspended in 0.1 ml acetone was applied to the backs of 30 mice of each sex 3 days per week for 104 weeks. During the first 16 weeks, doses were 0.005 micrograms HCDD per application. An additional 30 mice of each sex were pretreated with one application of 50 DMBA in 0.1 ml acetone 1 week before the initiation of the HCDD applications. As vehicle controls, 45 mice of each sex received 0.1 ml of acetone three times per week. Thirty animals of each sex served as untreated controls. In male mice the incidence of alveolar/bronchiolar carcinomas in the group administered only HCDD was significantly higher than that in the vehicle-control group; however, the incidence was not significantly higher when compared with the untreated controls. In female mice, the incidences of fibrosarcomas of the skin were higher in animals administered HCDD (both with and without pretreatment with DMBA) than in the untreated-control group; however, when the incidences were compared with those of the vehicle controls the results were not significant. Under the conditions of this bioassay, HCDD was not carcinogenic for male or female Swiss-Webster mice.

PB81-124844 PC **A08**/MF **A01**
National Cancer Inst., Bethesda, MD. Carcinogenesis Testing Program.

Bioassay of a Mixture of 1, 2, 3, 6, 7, 8-Hexachlorodibenzo-p-Dioxin and 1, 2, 3, 7, 8, 9-Hexachlorodibenzo-p-Dioxin (Gavage) for Possible Carcinogenicity.
Technical rept.
Aug 80, 174p DHHS/PUB/NIH-80-1754, NCI-CG-TR-198, NTP-80-12

A bioassay of a mixture of 1,2,3,6,7,8- and 1,2,3,7,8,9-hexachlorodibenzo-p-dioxins (HCDD) for possible carcinogenicity was conducted by administering the test material by gavage to Osborne-Mendel rats and B6C3F1 mice for 104 weeks. Fifty rats and 50 mice of each sex were administered HCDD suspended in a vehicle of 9:1 corn oil-acetone 2 days per week for 104 weeks at doses of 1.25, 2.5, or 5 micrograms/kg/wk for rats and male mice and 2.5, 5, or 10 micrograms/kg/wk for female mice. Seventy-five rats and 75 mice of each sex served as vehicle controls. 25 untreated animals of each sex and species were present in the treatment room, and in the vehicle-control room. In male rats, hepatocellular carcinomas or neoplastic nodules occurred at low incidences that were dose related but were not deemed statistically significant. In female rats, however, hepatocellular carcinomas, adenomas, or neoplastic nodules occurred at incidences that were dose related and statistically significant. In male and female mice, hepatocellular carcinomas or adenomas occurred at incidences that were dose related and statistically significant. Complex nonneoplastic toxic liver lesions were seen in all dosed groups of rats and mice. Compound-associated hyperplastic lesions of the lung were also found in both male and female rats. Under the conditions of this bioassay, HCDD administered by gavage was carcinogenic, causing increased incidences of hepatocellular carcinomas or neoplastic nodules in female Osborne-Mendel rats and inducing hepatocellular carcinomas and adenomas in male and female B6C3F1 mice. HCDD was not demonstrated to be carcinogenic for male rats.

PB81-125692 PC **A02**/MF **A01**
Charleston Coll., SC. Grice Marine Biological Lab.
'Rivulus marmoratus': A Unique Fish Useful in Chronic Marine Bioassays of Halogenated Organics.
Journal article,
Christopher C. Koenig, and Claudia McLean.
1980, 9p EPA-600/J-80-155, ERL.GB-0099
Grant EPA-R-805469
Pub. in Water Chlorination Environmental Impact and Health Effects, v3 p827-833 1980.

Results are reported for chronic marine bioassays exposing the cyprinodontid fish Rivulus marmoratus, to 2,3,4,6-tetrachlorophenol. Purpose of the study was to illustrate the value of R. marmoratus as a chronic bioassay animal. Results demonstrated the relative insensitivity of R. marmoratus to chronic toxic effects of the chemical, but pathological changes were observed. Fish at least two-months-old showed gill damage ranging from severe (at the highest exposure concentration) to moderate and slight (at the lowest concentration). Such pathological changes might not be seen in chronic laboratory experiments with organisms of greater sensitivities.

PB81-800294 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Water Pollution Effects of Metals on Fresh Water Fish. 1964-November, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-Nov 80,
Elizabeth A. Harrison. Nov 80, 123p
Supersedes PB80-800816, and NTIS/PS-78/1006.

The heavy metals covered in the bibliography include copper, zinc, mercury, chromium, cadmium, lead and iron. The abstracts include studies on the distribution of metals and water quality as a result of pollution by sewage effluents and industrial wastes. Also discussed are bioaccumulation, indicator species, toxic effects, and food chains. (This updated bibliography contains 116 citations, 13 of which are new entries to the previous edition.)

7. CHEMISTRY

7A. Chemical Engineering

BNL-51233 PC **A03**/MF **A01**
Brookhaven National Lab., Upton, NY.
Alternative Process Schemes for Coal Conversion. Progress Report No. 4, September 1, 1979-March 30, 1980.
M. J. Sansone. Apr 80, 50p
Contract AC02-76CH00016

This progress report is divided into two parts. In Part A, the results of the first three progress reports which dealt with the separation of H sub 2 / CH sub 4 and H sub 2 /CH sub 4 /CO mixtures resulting from coal gasification processes are briefly summarized. The separation calculations were performed for ideal, cryogenic, clathrate (gas-hydrate), and absorption/stripping separation processes. The cryogenic separation indicates the least energy requirement. Work on this phase of the program has been concluded. An experimental coal gasification program is being undertaken. In Part B, a review smmary of existing and developing coal gasificaton processes is presented. The relative merits of gasifier type, heating method, operating mode, process conditions, and gasifying medium are considered. This is followed by a qualitative appraisal of several selected coal gasification processes based upon the above considerations. It is intended that this report will help focus attention on those areas in which significant process improvements can be realized. The report concludes with a series of recommendations for future work. (ERA citation 05:035867)

DOE/ER/10468-1 PC **A03**/MF **A01**
Carnegie-Mellon Univ., Pittsburgh, PA.
Fundamental Studies of Erosion for Coal Gasification Systems. Annual Progress Report, 1 November 1979-30 June 1980.
P. S. Follansbee, G. B. Sinclair, and J. C. Williams. 27 Jul 80, 45p
Contract AC02-79ER10468

The effort in this program is divided between modelling the particle impact event using numerical methods and computer calculations and actual measurement of erosion rates. While the results obtained from each of these activities must be combined to provide an improved understanding of particulate erosion of ductile materials, it is convenient to describe separately the progress in each activity area. The first step in the application of the finite element method to any problem is the dissolution of the continuum into small elements. The intent of this procedure is to use as few total elements as possible and to make the elements small where gradients are large and vice versa. The exact solution for the contact of a rigid cylinder with an elastic surface is available from Hertz. This solution has been compared with the computer results obtained from finite element maps containing 148, 273, and 474 elements. The correlation between the computer results and elastic solution is not good for the map with the fewest elements, but improves as the number of elements increases. Convergence to this exact solution has been examined as a function of the number of map elements as a means of improving the efficiency of the design process used to obtain the maps. Having done this, the next step was to include the effects of plasticity. In order to validate the model, the measurement of erosion rates and observation of damage on eroded samples is necessary. Since it takes billions of impacts to lead to measurable weight loss, the experiment must be carefully designed to assure meaningful results. Three facets of the experimental portion of this study are described: the construction of the erosion apparatus, the characterization of the erosion environment and the preliminary erosion results. (ERA citation 05:035870)

DOE/PETC/TR-80/7 PC **A03**/MF **A01**
Department of Energy, Pittsburgh, PA. Pittsburgh Energy Technology Center.
Methanation in Catalyst-Sprayed Tube Wall Reactors: A Review.
H. W. Pennline, R. R. Schehl, W. P. Haynes, and A. J. Forney. Sep 80, 31p

The design and operation of catalyst-sprayed tube wall reactors for methanation are discussed. Reactor tubes were either coated on the inner surface or on the outer surface with a Raney nickel catalyst. A liquid coolant, which was opposite the catalyst-reactant gas-side, removed the heat of methanation. Catalyst performance, reactor operating conditions, spent catalyst analyses, and other results are presented for five PDU tests. (ERA citation 05:035874)

FE-1792-61 PC **A17**/MF **A01**
Lockheed Missiles and Space Co., Inc., Sunnyvale, CA.
Coal Feeder Development Program. Phase III Report.
Sep 79, 392p
Contract AC01-76ET10260

As a result of the work carried out in Phases I and II, the Kinetic Extruder was selected for further development during Phase III. Design studies were performed to identify components of the Kinetic Extruder which had an important impact on performance. These components were optimized and subjected to testing in the coal feeder test loop. The improved components were incorporated in the design of the Kinetic Extruder, Model No. 3, which was successfully tested up to 400 psig. The Kinetic Extruder Model No. 4 was designed to incorporate low differential pressure seals and provision for fluidic turndown control. This machine is ready for testing and engineering evaluation. (ERA citation 05:035876)

FE-2777-1 PC **A02**/MF **A01**
Exxon Research and Engineering Co., Baytown, TX.
Exxon Catalytic Coal Gasification Process Development Program. Quarterly Technical Progress Report, July 1-September 30, 1978.
Nov 78, 19p
Contract ET-78-C-01-2777

This report covers the activities for the Exxon Catalytic Coal Gasification Development Program during the quarter from July 1-September 30, 1978. The separation of the char-lime residue from the recovered potassium solution in the catalyst recovery system has been identified as a troublesome step in pilot plant operations. Many of the char-lime particles are smaller than 10 microns, and the effective density of the char particles is close to that of the recovered potassium solution. Promising approaches for improving this separation have been identified. The present kinetic model for catalytic gasification is based almost entirely on data from devolatilized coal at 1300 exp 0 F and some limited data at 1200 exp 0 F. Plans have been made to expand the data base to include the gasification kinetics of steady state char from the fluid bed gasifier (FBG) to determine the effect of carbon conversion on reaction rate and to better define the effect of temperature. Engineering cost reduction studies have identified a potential economic incentive to reduce the methane content of the recycle gas stream below the 10% CH sub 4 level in the current study. This step would require more cryogenic refrigeration but would significantly reduce the amount of recycle gas, reduce the offsite stream required, and reduce the gas feed to acid gas recovery. A more detailed study is planned. An additional incentive study has begun to determine the potential for a cryogenic separation system to remove the acid gases from the product gas. Since the acid gas separation system makes up about 15% of the gas cost, savings here could be very beneficial. (ERA citation 05:035878)

LASL-80-13(MINI-REV.) PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.

Synfuels from Coal Lessons: From South Africa.
R. S. Thurston. Jul 80, 4p
Contract W-7405-ENG-36

The most significant lessons provided by these developments at SASOL are the importance of long-range planning and the need for establishing a commercialized technology base in synfuels. These are necessary to reduce our dependence on foreign energy sources and can be accomplished with suitable cooperation between government and private industry and between agencies within the government. The Fischer-Tropsch process is not the only method for producing gasoline from coal, but so far it is the only one commercially proven. Another process, which produces gasoline from methanol, has been considered for commercialization. The government of New Zealand decided in December 1979 to build a commercial-size plant using its abundant natural gas as the feedstock in a natural gas to methanol to gasoline process. Because methanol can also be produced from gasified coal, this process may be an attractive option for the production of gasoline from coal in the United States. South Africa has demonstrated that a nation can respond quickly to a deteriorating energy situation by making a long-term commitment to the establishment of an alternative energy technology. Their commitment went beyond the planning, research, and pilot-plant stages. They built a commercial-size plant to develop the appropriate producion, marketing, and environmental expertise to use the alternative technology with confidence. For the United States to be prepared to bring an alternative energy technology on-line quickly, it too will have to make long-term commitments by building commercial-size plants. (ERA citation 05:035891)

7B. Inorganic Chemistry

N81-10169/3 PC **A04**/MF **A01**
Ultrasystems, Inc., Irvine, CA.
Phosphazene Diamines.
Contractor Report, Jun. 1979 - Apr. 1980.
K. L. Paciorek, D. H. Harris, T. I. Ito, and R. H. Kratzer. Oct 80, 61p NASA-CR-165147, SN-8342-F
Contract NAS3-22019

The synthesis of a specific phosphazene diamine was optimized, other phosphorus-containing diamines were prepared, and their effect upon certain characteristics of epoxy resins, prepared via reaction with MY 720, in particular, char yield at elevated temperatures was evaluated. The synthesis of the phosphazene diamine resulting from the interaction of methylenedianline with 4,4'-bis(diphenylphosphino)biphenyl was simplified into a one step process giving 77 percent yield of the pure product. Using this procedure, a related diamine containing bis(diphenylphosphino)methane was obtained in a 70 percent yield. Preparation of another class of phosphorus containing amines based upon p-aminophenyldiphenyl-phosphine was unsuccessful; the inability to produce p-aminophenylithlum was responsible for this failure. Seven epoxy resins employing Araldite MY 720, diaminodiphenylsulfone, and two of the phosphorus containing diamines were prepared, characterized, and their char yield capacity at elevated temperatures assessed. Based on these investigations, the resins containing phosphorus appear to exhibit significantly better char formation characteristics than materials hardened using conventional amines, without impairing the other properties measured.

7C. Organic Chemistry

CEA-CONF-4680 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Centre d'Application et de Promotion des Rayonnements Ionisants.
New Developments in Irradiation Treatments.
G. Gaussens. 1979, 12p
In French.
U.S. Sales Only.

Various processes using ionizing radiations are used in industry and allow the commercialization of many products made of polymers, the properties of which were modified by irradiation. Those modifications are made to remove a drawback of a polymer or to bring the improvement of one or several new properties. By grafting it is mainly possible to modify the chemical properties of the basic polymer; the grafting allows to make fabrics having bacteriostatic properties, polyethylene having adhesive properties on metals, perm-selective membranes, biocompatible polymers and so on. The polymerizing cross linking, which is a combination of polymerization and cross linking is mainly used for surface treatments, for the curing of varnishes, paints, inks, at high speeds, on various substrates, as wood, paper, metals. The radiation induced cross-linking of polymers, which can be obtained by chemical initiation as well, is generaly more easily controlled and the economy of the process is often better. (Atomindex citation 11:517822)

PB81-118473 Not available NTIS
National Bureau of Standards, Washington, DC.
Pseudooxocarbons. Synthesis of 1, 2, 3-tris (Dicyanomethylene) Croconate Salts. A New Bond-Delocalized Dianion.
Final rept.,
A. J. Fatiadi. Mar 80, 2p
Pub. in Jnl. Organ. Chem. 45, n7 p1338-1339 Mar 80.

The synthesis and characterization of new bond-delocalized dianions, e.g., 1,2,3-tris(dicyanomethylene)croconate salts have been described. The dianions reported are new additions to the aromatic oxocarbons, and represent a new class of aromatic, nonbenzenoid compounds, named pseudo-oxocarbons.

7D. Physical Chemistry

AD-A090 856/6 PC **A02**/MF **A01**
New York Univ., NY. Dept. of Physics.
Application of Laser Spectroscopy to Collisional Studies,
P. R. Berman. 1979, 10p
Contract N00014-77-C-0553

The traditional method for studying atomic or molecular collisions is the use of crossed atomic or molecular beams. Owing to the low beam densities one encounters, such studies have generally been restricted to atoms or molecules in ground or metastable states; however, it is now possible to use lasers to achieve substantial excited state atomic populations so that scattering from excited states may also be studied in crossed beam experiments. Typically, one obtains the differential scattering cross section as a function of center-of-mass energy in crossed beam experiments. These experiments, although often difficult to perform, provide a 'direct' measure of the scattering process.

AD-A090 857/4 PC **A02**/MF **A01**
New York Univ., NY. Dept. of Physics.
Collisional Effects in the Saturation Spectroscopy of Three-Level Systems: Theory and Experiment,
P. R. Berman, P. F. Liao, and J. E. Bjorkholm. 1977, 2p
Contract N00014-77-C-0553

This document reports on a theoretical and experimental study of the influence of collisions on the saturation spectroscopy line shapes associated with three-level gas vapor systems. The study is carried out with the goal of gaining new information concerning (a) the collisional processes that occur in atomic vapors, (b) the nature of the interatomic potential between a ground state and an excited-state atom and (c) the possibility of collision-induced enhancement of the absorption of radiation by an atomic system. In each of these areas, new results are obtained.

AD-A090 858/2 Not available NTIS
Texas Univ. at Austin. Dept. of Chemistry.
Electrochemical and Photoelectrochemical Studies of Excess Electrons in Liquid Ammonia,
Allen J. Bard, Kingo Itaya, and Richard E. Malpas. 17 Jul 79, 6p ARO-15976.4-C
Grant DAAG29-78-G-0191
Availability: Pub. in Jnl. of Physical Chemistry, v84 n10 p1262-1266 1980 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A090 859/0 Not available NTIS
Texas Univ. at Austin. Dept. of Chemistry.
Electrogenerated Chemiluminescence. XXXVI. The Production of Steady Direct Current ECL in Thin Layer and Flow Cells,
George H. Brilmyer, and Allen J. Bard. 15 Feb 79, 9p ARO-15976.3-C
Grant DAAG29-78-G-0191
See also AD-A032 625.
Availability: Pub. in Jnl. of the Electrochemical Society, v127 n1 p104-110 Jan 80.

No abstract available.

AD-A090 860/8 Not available NTIS
Texas Univ. at Austin. Dept. of Chemistry.
Application of Photothermal Spectroscopy to in-Situ Studies of Films on Metals and Electrodes,
George H. Brilmyer, and Allen J. Bard. 18 Jun 79, 8p ARO-15976.5-C
Grant DAAG29-78-G-0191
Availability: Pub. in Analytical Chemistry, v52 n4 p685-691 Apr 80 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A090 861/6 Not available NTIS
Texas Univ. at Austin. Dept. of Chemistry.
Simultaneous Determination of Quantum Efficiency and Energy Efficiency of Semiconductor Photoelectrochemical Cells by Photothermal Spectroscopy,
Akira Fujishima, Yasuhisa Maeda, Kenichi Honda, George H. Brilmyer, and Allen J. Bard. 18 Jun 79, 9p ARO-15976.6-C
Grant DAAG29-78-G-0191
Availability: Pub. in Jnl. of the Electrochemical Society, v127 n4 p840-846 Apr 80 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A090 862/4 Not available NTIS
Texas Univ. at Austin. Dept. of Chemistry.
Successive Electron Transfers to Molecules with Identical Interacting Centers - The Electroreduction of alpha, omega-9,9 -Dianthrylalkanes,
Kingo Itaya, Allen J. Bard, and Michael Szware. 11 Nov 78, 10p ARO-15976.7-C
Grant DAAG29-78-G-0191
Availability: Pub. in Zeitschrift fuer Physikalische Chemie Neue Folge, v112 p1-9 1978 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A090 868/1 Not available NTIS
Texas Univ. at Austin. Dept. of Chemistry.
Thermal Decomposition of Propane,
T. Koike, and W. C. Gardiner, Jr. 1980, 6p ARO-15826.8-C
Grant DAAG29-78-G-0174
Availability: Pub. in Jnl. of Physical Chemistry, v84 n16 1980 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A090 878/0 Not available NTIS
Pittsburgh Univ., PA. Dept. of Physics and Astronomy.
Three-Body Association Reactions of He+, Ne+, and Ar+ Ions in Their Parent Gases from 78 to 300K,
Rainer Johnsen, Aikwo Chen, and Manfred A. Biondi. 14 Apr 80, 5p ARO-14656.6-P
Grant DAAG29-77-G-0079
Availability: Pub. in Jnl. of Chemical Physics, v73 n4 p1717-1720, 15 Aug 80 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A090 881/4 PC **A02**/MF **A01**
Texas Univ. at Austin. Electronics Research Center.
Exciton Lifetimes in Electron Beam Excited Condensed Phases of Argon and Xenon,
J. W. Keto, R. E. Gleason, and F. K. Soley. 16 Apr 79, 7p AFOSR-TR-80-0794
Contract F49620-77-C-0101
Pub. in Jnl. of Chemical Physics, v71 n6 p2676-2681, 15 Sep 79.

No abstract available.

AD-A090 894/7 Not available NTIS
Oregon Univ., Eugene. Dept. of Physics.
Relativistic Radiationless Transition Probabilities for Atomic K and L Shells,
Mau Hsiung Chen, Bernd Crasemann, and Hans Mark. 1979, 27p ARO-15208.8-P
Grants DAAG29-78-G-0010, AFOSR-79-0026
Availability: Pub. in Atomic Data and Nuclear Data Tables, v24 n1 p13-37 Jul 79 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A090 917/6 PC **A02**/MF **A01**
Chicago Univ., IL. James Franck Inst.
Comment on the Rotational State Dependence of Indirect Photodissociation of a Polyatomic Molecule,
Frank A. Novak, and Stuart A. Rice. 17 Apr 80, 6p AFOSR-TR-80-1066
Contract F49620-76-C-0017, Grant NSF-CHE78-01573
Pub. in Proceedings of the National Academy of Sciences of the United States of America, v77 n7 p3753-3755 Jul 80.

No abstract available.

AD-A090 921/8 PC **A02**/MF **A01**
Army Electronics Research and Development Command, Fort Monmouth, NJ. Electronics Technology and Devices Lab.
Electrochemical Reduction of Sulfuryl Chloride in Solutions Containing Lithium Tetrachloroaluminate.
Technical rept.,
Wishvender K. Behl. Sep 80, 19p Rept no. DELET-TR-80-17

The electrochemical reduction and oxidation of sulfuryl chloride in 1 molar LiAlCl4-So2Cl2 solutions were studied at glassy carbon electrodes using the technique of cyclic voltammetry. It was found that the reduction of chlorine, which is formed by the decomposition of sulfuryl chloride, precedes and obscures the reduction of sulfuryl chloride. Thus, in chloride rich solutions, sulfuryl chloride reduction peak in the cyclic voltammograms is completely masked by the chlorine reduction peak. However, in solutions saturated with sulfur dioxide, the chlorine reduction peak is relatively smaller than the sulfuryl chloride reduction peak. The reduction of both chlorine and sulfuryl chloride leads to the deposition of insoluble lithium chloride at the electrode surface and results in its passivation. The electrochemical oxidation of LiAlCl4-SO2Cl2 solutions leads to the formation of chloride, first by the oxidation of AlCl4(-) ions followed by the oxidation of sulfuryl chloride. (Author)

AD-A090 925/9 PC **A02**/MF **A01**
Chicago Univ., IL. James Franck Inst.
The Influence of Rotational Motion on Intersystem Crossing in Isolated Molecules,
Frank A. Novak, and Stuart A. Rice. 15 Oct 79, 9p AFOSR-TR-80-1067
Contract F49620-76-C-0017, Grant NSF-CHE78-01573
Pub. in Jnl. of Chemical Physics, v73 n2 p858-864, 15 Jul 80.

No abstract available.

AD-A090 948/1 PC **A02**/MF **A01**
Georgia Inst. of Tech., Atlanta. Electromagnetics Lab.
The Kinetics and Spectroscopy of Aircraft and Rocket Plume Constituents.
Interim rept. no. 3, 1 Jun 79-31 May 80,
A. R. Ravishankara, and F. P. Tully. 30 Aug 80, 18p AFOSR-TR-80-1006
Contract F49620-77-C-0111

Utilizing the technique of flash photolysis-resonance fluorescence the rate constants for the reactions of hydroxyl radicals (OH) with deuterium, hydrogen chloride, and propane were measured at elevated temperatures as high as 1000K. Distinct curvature was observed in the Arrhenius plots for OH reactions with HC1 and propane while the OH + D2 reaction rate coefficient seemed to follow the Arrhenius law quite well. The measured rate constants were compared with previous measurements in the literature. (Author)

AD-A090 951/5 PC **A02**/MF **A01**
Georgia Inst. of Tech., Atlanta. School of Physics.
The Drift, Diffusion, and Reactions of Slow Ions in Gases.
Final rept. 1 Jul 75-28 Feb 80,
E. W. McDaniel, and I. R. Gatland. 28 Feb 80, 7p
Contract N00014-76-C-0015

The Georgia Tech program of research on ionic transport in gases is described. Experimental measurements of ionic mobilities and diffusion coefficients are discussed. The use of mobility data to obtain ion-neutral interaction potentials is described. References are given for publications covering this report period. (Author)

AD-A090 954/9 PC **A02**/MF **A01**
School of Aerospace Medicine, Brooks AFB, TX.
Recovery of Volatile Organics from Sorbent Tube Sampling Systems.
Progress rept. Jan 78-Nov 79,
William W. Lackey, Charles L. Martin, James P. Conkle, and Richard L. Miller. Aug 80, 15p Rept no. SAM-TR-80-22

Comparative data are presented on the recovery of organic compounds (vapors) from solid sorbent (tenax-GC) sampling tubes by thermal desorption of the tube contents (a) directly onto a packed gas chromatographic column, vs. (b) onto an unpacked precolumn loop for subsequent injection into the gas chromatography. Twenty to eighty percent increases in flame ionization detector (FID) response were obtained for a limited selection of compounds which were desorbed directly oncolumn. The apparent overall increase in system sensitivity allowed detection and identification of compounds at lower levels than were previously possible. A table of compound recoveries lists the recoveries from the Tenax-GC sorbent for the standards used in this experiment. (Author)

AD-A090 973/9 PC **A02**/MF **A01**
Singer Co Little Falls NJ Kearfott Div
Analysis of the Dark Film in rf-Excited Mercury Lamps,
P. A. Heimann, and J. H. Simpson. 25 Jan 80, 3p AFOSR-TR-80-0975
Contract F49620-76-C-0009
Pub. in Applied Physics Letters, v36 n12 p963-964, 15 Jun 80.

No abstract available.

AD-A090 975/4 PC **A02**/MF **A01**
San Antonio Air Logistics Center Kelly AFB TX Quality Div
Contaminant Increase in Aircraft Liquid Oxygen Converters; Analysis of Data.
Rept. for Mar-May 79,
Lester L. Dziuk. Aug 80, 22p Rept no. SAALC/SFQ-TR-80-1

Analysis of data collected during a study of contaminant buildup in an aircraft liquid oxygen converter is presented. The data indicates that contaminants increase during the interval between fillings and that contaminants are removed during fillings. No overall trend of contaminant increase was observed. (Author)

AD-A090 998/6 Not available NTIS
Columbia Radiation Lab. New York.
New Infrared Absorption Bands of Sodium Vapor,
A. Vasilakis, N. D. Bhaskar, and W. Happer. 3 Apr 80, 5p ARO-16979.2-P
Contract DAAG29-80-C-0043, Grant AFOSR-79-0082
Availability: Pub. in Jnl. of Chemical Physics, v73 n4 p1490-1493, 15 Aug 80 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A091 070/3 PC **A03**/MF **A01**
Foreign Technology Div., Wright-Patterson AFB, OH.
About the Series Spectra of the Elements Oxygen, Sulfur, and Selenium,
C. Runge, and F. Paschen. 18 Aug 80, 42p Rept no. FTD-ID(RS)T-1043-80
Edited trans. of Annalen der Physik und Chemie (German D.R.) v61 n8 p641-687 1897, by Andras Riedlmayer.

No abstract available.

AD-A091 087/7 PC **A03**/MF **A01**
Michigan Univ., Ann Arbor. Radiation Lab.
Analysis for Coherent Anti-Stokes Raman Spectroscopy (CARS).
Final rept. 1 Jan-30 Jun 80,
Herschel Weil. Jun 80, 39p 017896-1-F, AFOSR-TR-80-1007
Grant AFOSR-80-0106

Coupled differential equations have been formulated which model the generation of coherent anti-Stokes Raman radiation in molecular gases. The equations include not only the basic term which involves the coherent interaction of incident pump and idler (Stokes) waves to generate the anti-Stokes radiation, but also include additional terms which model other radiation and absorption processes, both stimulated and coherent, which occur simultaneously. These are important in determining saturation effects due to population depletion of the lowest energy level. Other effects have also been considered. These are a finite idler beam bandwidth (simultaneous excitation of more than one vibration frequency) a quasi-monochromatic idler beam slightly off the true Stokes frequency; laser pulse shape; modification of the result for different rotational levels. A number of different computer codes have been developed to solve the equations at different levels of complexity. With them numerical investigation of the effects of various physical factors on saturation was carried out. Some of the results are presented graphically. (Author)

AD-A091 100/8 PC **A02**/MF **A01**
University of Southern California, Los Angeles. Dept. of Chemistry.
Insertion Reaction of Dimethylsilylene into Si-H and Si-OR Bonds,
Taiyin Yang Gu, and William P. Weber. 12 Dec 79, 11p AFOSR-TR-80-0972
Grant AFOSR-80-0006
Pub. in Jnl. of Organometallic Chemistry, v195 p29-38 1980.

No abstract available.

AD-A091 246/9 PC **A03**/MF **A01**
Army Armament Research and Development Command, Aberdeen Proving Ground, MD. Ballistics Research Lab.
BRLGRAY: The Ballistic Research Laboratory Version of the GRAY Equation of State.
Technical rept.,
Joseph F. Lacetera. Aug 80, 36p ARBRL-TR-02258, AD-E430 515

The BRLGRAY EOS is described. EOS input parameters and mixed-phase boundaries are shown for Al, Cu, and Fe. Comparisons are shown with Tillotson and HULL EOS's.

AD-A091 248/5 PC **A03**/MF **A01**
Army Armament Research and Development Command, Aberdeen Proving Ground, MD. Ballistics Research Lab.
Collision-Induced Transfer Rates Connecting Fine-Structure Levels in Diatomic Sulfur in an Excited Vibrational Level Where V'=4.
Technical rept.,
Thomas A. Caughey, and David R. Crosley. Aug 80, 34p ARBRL-TR-02259, AD-E430 518

Rates for collision-induced transfer between a single rotational level (v = 4, J = 41) and other

individual rotational levels within the same vibrational level of the B-state of diatomic sulfur are reported. The sulfur was excited into the B-state by the radiation from an atomic zinc lamp, and rotationally resolved fluorescence measurements were used to determine the rates for the collision partners He, Ar and Xe.

AD-A091 249/3 PC **A03**/MF **A01**
Johns Hopkins Univ., Baltimore, MD.
Quantum Chemical Investigations of the Mechanism of Cationic Polymerization.
Summary rept. 1 Oct 79-30 Sep 80,
Joyce J. Kaufman. 15 Oct 80, 27p Rept no. TR-1
Contract N00014-80-C-0003

In the research on part I of this project we are carrying out ab-initio quantum chemical calculations and generating electrostatic molecular potential maps for cationic polymerization: on energetic monomers, on their interaction with catalysts and on the attack of the monomer-catalyst complexes on the substrates. This research is in support of an ongoing overall project of the Power Program Branch of ONR designed to develop energetic binders for use with energetic propellants. We are pursuing several approaches to the predictions of crystal structures and densities. The first is to calculate (from calculations on the super-molecules) the SCF intermolecular interaction, separate it into its various components and use these to construct the crystal structure. The second approach is to carry over the concept recently used successfully in calculations for biological systems where the same ab-initio calculations between two or several of such molecules for a large variety of inter-molecular configurations is used to derive atom class-atom pair-pair and three-body potentials which are then used to calculate the intermolecular structure of an arrangement of molecules.

AD-A091 293/1 PC **A03**/MF **A01**
Georgia Inst. of Tech., Atlanta. Engineering Experiment Station.
A Kinetic Study of the Reaction of Ch3 02 with N02. Volume I,
A. R. Ravishankara, R. L. Eisele, and P. H. Wine. 1980, 39p FAA/EE-80-38-VOL-1
Contract DOT-FA78WA-4259

The technique of pulsed laser photolysis-long path laser absorption is employed to study the kinetics of the reaction CH3O2 + NO2 + N2 yields at K sub 1 CH3O2NO2 + N2 over the temperature range 253-353 K. At all temperatures, k sub 1 is found to monotonically increase with increasing N2 pressure over the range 76-722 torr, indicating that reaction occurs predominantly by addition. The dependence of k sub 1 on N2 pressure shows that the reaction is in the fall-off region between second and third order kinetics. These results are compared with previous results and their atmospheric implications are discussed. (Author)

AD-A091 294/9 PC **A02**/MF **A01**
Pennsylvania State Univ University Park Dept of Materials Science and Engineering
A Model for Decreasing Hydrogen Absorption in Metals Applicable to Ion Implanted Membranes.
Technical progress rept.,
H. W. Pickering, and M. Zamanzadeh. 20 Oct 80, 16p Rept no. TR-13
Contract N00014-75-C-0264

A model is presented for decreasing hydrogen absorption by catalyzing the hydrogen evolution reaction (h.e.r.). Its salient features are the presence of a metal on the substrate surface with a higher exchange current density for the h.e.r. than that of the substrate, and a mechanism of hydrogen evolution for which the coverage of the surface is a function of the overpotential. Pt-implanted Fe membranes are evaluated with regard to their catalytic character for the h.e.r. using a Devanathan-Stachurski permeation cell. These data are in full accord with, and illustrate, the above model for decreasing H absorption. Factors affecting the choice of implants for decreasing hydrogen absorption (via modification of the overpotential and the hydrogen coverage) include the nature of the implanted species for catalyzing the H.e.r.; the concentration profile of the implanted species, in particular its concentration in the surface atomic layer(s); and the tendency for enrichment of the surface in the implanted species, as occurs during open circuit corrosion. These factors are illustrated in the data. (Author)

AD-A091 295/6 PC **A02**/MF **A01**
Drexel Univ., Philadelphia, PA. Dept. of Chemistry.
Infrared Emission by an Aerosol Cloud.
Final rept. 1 Jul 78-30 Jun 80,
Raymond A. Mackay. 10 Oct 80, 24p ARO-16065.1-C
Contract DAAG29-79-C-0068, Grant DAAG29-78-G-0117

The present study was designed to produce infrared emission by means of exothermic reaction between a gas and a liquid aerosol. We have examined a number of gas-aerosol systems employing acid-base reactions, and have observed significant levels of radiation from the reaction of chlorosulfonic acid aerosol with gaseous ammonia and water. Other systems, including sulfuric acid-ammonia, octanoic acid-ammonia and octylamine-hydrogen chloride, have produced detectable levels of radiation. Some methods for the investigation of emission from gas-aerosol reactions have been explored, and the results of these studies utilizing a chlorosulfonic aerosol system are presented. (Author)

AD-A091 299/8 PC **A04**/MF **A01**
Fairchild Camera and Instrument Corp., Palo Alto, CA. Research and Development Lab.
Process Variable Dependence and Interrelationship between Avalanche Injected and Radiation Induced Carrier Trapping in Thermal Oxides.
Final technical rept. 1 Apr 79-31 Mar 80,
B. E. Deal, and R. R. Razouk. Jul 80, 53p
Contract N00014-79-C-0297

Characterization of the process dependence of avalance injected electrons and holes in thermally grown silicon dioxide has been carried out. Process parameters investigated include oxidation temperature (900, 1000 and 1100 deg C), oxidation ambient (O2, H2O, and O2/HCl), post-oxidation in situ anneal ambient (N2, Ar), cooling ambient (O2, N2, Ar, and H2O), cooling rates (less than 3 sec, 2 min, and 10 min), and post-metallization anneal ambients (N2, N2/H2). Results indicate basic differences between the process dependence of electron traps and that of hole traps while excellent agreement is obtained between avalanche injected and radiation induced hole trapping. Characteristics of the process dependence of hole traps are: a minimum for dry O2 oxides, an increase for N2 post oxidation anneals a 1000 deg C and above, and a high density for HCl/O2 and steam grown oxides. Electron trap densities are minimum at 1100 deg C and highest for steam grown oxides although post oxidation anneals at 1000 deg C are effective in their reduction. Post-metallization anneal ambients were found to have little or no effect on the measured trapping of both holes and electrons. (Author)

AD-A091 322/8 Not available NTIS
California Univ., Berkeley. Naval Biosciences Lab.
The Use of 13C Nuclear Magnetic Resonance Spectrometry (13Cnmr) for Characterization of Petroleum Residues and for the Study of Petroleum Biodegradation,
H. E. Guard, and W. M. Coleman, III. 30 Jun 80, 7p
Contract N00014-75-C-0774
Availability: Pub. in Chemosphere, v9 p377-383 1980 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A091 336/8 PC **A02**/MF **A01**
Air Force Geophysics Lab., Hanscom AFB, MA.
Radiative Decay and Radiationless Deactivation in Selectively Excited CN,
D. H. Katayama, Terry A. Miller, and V. E. Bondybey. 9 Mar 79, 9p Rept no. AFGL-TR-80-0290
Pub. in Jnl. of Chemical Physics, v71 n4 p1662-1669, 15 Aug 79.

No abstract available.

AD-A091 344/2 PC **A02**/MF **A01**
Rochester Univ., NY. Dept. of Chemistry.
The Electrocatalytic Reduction of Carbon Dioxide Using Macrocycles of Nickel and Cobalt.
Technical rept.,
Barbara J. Fisher, and Richard Eisenberg. 24 Oct 80, 11p Rept no. TR-1
Contract N00014-80-C-0525

Carbon dioxide has been activated towards reduction by electrochemically primed transition metal complexes. This indirect reduction allows more favorable electrode potentials than those required when CO2 is reduced directly. The metal complexes employed were Curtis type tetraazamacrocyclic complexes of nickel and cobalt. The electrode potentials ranged from -1.3v to -1.6v vs SCE. Evidence for CO2 reduction was obtained from controlled potential coulometry experiments performed in a gas tight electrolysis cell followed by g.c. analysis. The solvents used were either CH3CN-H2O or water only. Carbon monoxide was found to comprise at least 50% of the total reduced products in all cases; H2 was also produced in most cases. While a protic source was found to be necessary for CO2 reduction to occur, the results show that CO2 competes effectively with H+ for the electrons available from the electrochemically reduced metal complexes. In addition, the reduction was found to be electrocatalytic, with current efficiencies for total reduced products as high as 98%. (Author)

AD-A091 354/1 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Solid Electrolytes Containing Both Mobile and Immobile Alkali Ions.
Journal article,
Henry Y-P. Hong. 1980, 7p JA-4947, ESD-TR-80-183
Contract F19628-80-C-0002, ARPA Order-600
Pub. in Jnl. of Power Sources, v5 p127-142 1980.

No abstract available.

AD-A091 367/3 Not available NTIS
Florida Univ., Gainesville. Dept. of Materials Science and Engineering.
Influence of a Thin Gold Surface Layer on the Electrochromic Behavior of WO3 Films,
A. R. Haranahalli, and D. B. Dove. 17 Dec 79, 4p ARO-13056.3-P
Grant DAAG29-76-G-0151
Availability: Pub. in Applied Physics Letters, v36 n10 p791-793, 15 May 80 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A091 369/9 Not available NTIS
Pennsylvania Univ., Philadelphia. Dept. of Physics.
Raman Scattering by Molecules Adsorbed at Metal Surfaces. The Role of Surface Roughness,
E. Burstein, and C. Y. Chen. 1980, 10p ARO-14332.9-P
Contract DAAG29-80-C-0066, Grant DAAG29-76-G-0325
Availability: Pub. in Proceedings of International Conference on Raman Spectroscopy (7th), p346-354 1980 (No copies Furnished by DTIC/NTIS).

No abstract available.

AD-A091 377/2 PC **A02**/MF **A01**
Washington Univ., Seattle. Dept. of Chemistry.
Transients in Thermal Isomerization of Cyclobutene by the Variable Encounter Method. Vibrational Energy Transfer and Relaxation at Lower Temperatures.
Technical rept.,
F. C. Wolters, M. C. Flowers, and B. S. Rabinovitch. 15 Oct 80, 18p Rept no. NR092-549-TR18
Contract N00014-75-C-0690

AN investigation of transients in cyclobutene vibrational relaxation by the VEM method has been made. Temperatures in the region 429 K to 778 K were used. Cyclobutene molecules isomerize to butadiene when transported above the critical threshold E sub 0. The collision efficiency of the wall increases with lowering of temperature, and strong collider behavior is obtained below 450 K. The data are described by a gaussian form of the

collisional transition probability function. An exponential form of the probability function cannot fit all of the data. (Author)

AD-A091 382/2 PC **A02**/MF **A01**
EIC, Inc., Newton, MA.
Nonaqueous Electrochemical Photovoltaic Cells Based on n-GaAs and n-Si.
Technical rept.,
Margaret E. Langmuir, Ronald H. Micheels, and R. David Rauh. 1980, 8p Rept no. TR-1
Contract N00014-79-C-0700
Presented at International Confernece on Photochemical Conversion and Storage of Solar Energy (3rd) held at Boulder, CO, 3-8 Aug 80, p373-375 1980.

The photoelectrochemical properties of n-GaAs and n-Si are compared in nonaqueous electrolytes. Si is the more sensitive material to surface treatment, and is more prone to anodic passivation. Surface adsorption of Ru or basic heterocyclic polymers greatly improves photocurrent yields for both materials, possibly due to a complexation of surface states. (Author)

AD-A091 393/9 Not available NTIS
California Univ., Berkeley. Lawrence Berkeley Lab.
Reaction and Deactivation of HCl(v=1,2) by Cl, Br, and H Atoms,
R. G. Macdonald, and C. Bradley Moore. 3 Mar 80, 9p ARO-15131.21-P
Grant DAAG29-77-G-0200
Availability: Pub. in Jnl. of Chemical Physics, v73 n4 p1681-1689, 15 Aug 80 (No copies furnished by DTIC/NTIS).

No abstract available.

AECL-6589 PC **A05**/MF **A01**
Atomic Energy of Canada Ltd., Chalk River (Ontario). Chalk River Nuclear Labs.
Progress Report, Chemistry and Materials Division, 1 April to 30 June, 1979.
Jul 79, 100p PR-CMa-49
U.S. Sales Only.

Research results are reported by groups investigating ion penetration, nuclear methods of analysis, accelerator operation, general analytical chemistry, radioactivity measurement, deuterium analysis, electrochemistry, mass spectrometry and fuel analysis, radiation chemistry and laser photochemistry, hydrogen-water exchange, isotope chemistry, surface chemistry, and electron microscopy. Work in an associated laboratory at the University of Toronto on isotopic changes in reaction rates is reported. (Atomindex citation 11:523527)

ANL/CEN/FE-80-11 PC **A02**/MF **A01**
Argonne National Lab., IL.
Sampling and Analysis of Hydrocarbons in Combustion Gases. Quarterly Report, April-June 1980.
I. Johnson, K. M. Myles, and A. A. Siczek. Jul 80, 14p
Contract W-31-109-ENG-38

The purpose of these studies is to develop a methodology for the chemical analysis of ultratrace levels of polycyclic organic compounds in the flue gases from fluidized-bed combustors. A brief review of current analytical methods has been made. Alternative methods, which have the potential for real time analysis, have been studied. Two methods, atmospheric-pressure chemical ionization followed by mass spectrometry and dual mass spectrometry, appear promising. (ERA citation 05:037036)

CONF-800859-3 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Coherent Absorption and Emission Processes of Energetic Particles Penetrating Crystals.
S. Datz. 1980, 10p
Contract W-7405-ENG-26
International conference on x-ray processes and inner-shell ionization, Stirling, UK, 25 Aug 1980.

Swift charged particles moving through an ordered array of atoms in a crystal experience periodic perturbations which can give rise to coherent absorption or emission of photons. Indeed the phenomenon of coherent bremsstrahlung arising from ultrarelativistic electron penetration of crystals has been studied for many years. The complexity of the Fourier components of the electric field experienced by the particle is greatly reduced if the direction of motion lies along a crystal axis or in a crystal plane. Here, however, the motion of the particle may be governed by correlated collisions with the atomic rows or planes and the particle is said to be channeled. In this case another periodicity is involved in the motion and transitions between bound states in the transverse motion can lead to radiation of another type which has been dubbed channeling radiation. Channeled, highly stripped ions of sufficiently high atomic number Z sub 1 greater than or equal to 5 can exist in a crystal in well defined quantum states and transitions between quantum states can be affected when resonant frequencies, dependent on crystal direction and velocity, are achieved. Studies of resonant coherent excitation of channeled ions constitute a form of absorption spectroscopy which yields information on the ionic states and the crystalline millieu. Experimental observation of both the absorption and emission phenomena in channeling has occurred only in the past two years and a brief review and collation of the various effects observed are presented in this paper. (ERA citation 05:035675)

CONF-800918-5 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Size Selective Synergism by Crown Ethers in the Extraction of Alkali Metals by di(2-Ethylhexyl) Phosphoric Acid.
W. J. McDowell, W. F. Kinard, and R. R. Shoun. 1980, 22p
Contract W-7405-ENG-26
International solvent extraction conference, Liege, Belgium, 6 Sep 1980.

Although the macrocyclic polyethers, known as crown ethers, complex metal ions and do so preferentially according to the size correspondance between the ion and the crown ether cavity, their usefulness as liquid-liquid extraction reagents has been limited by the necessity of solubilizing the anion in the organic phase. The common mineral acid anions are difficult to transfer to the organic phase and organophilic anions are expensive or impractical. A method is described that avoids this problem by combining organic-soluble cation exchangers with the crown ethers in the organic phase. The resulting mixtures show synergistic effect is size-selective. The size-dependence of the synergistic extraction in the system di(2-ethylhexyl) phosphoric acid/crown ethers parallels the extraction of picrate salts of the alkali metals and of the complex formation of the alkali picrates with crown ethers. A preliminary evaluation of concentration dependencies in the extraction of potassium by di(2-ethylhexyl) phosphoric acid-dicyclohexo-18-crown-6 mixtures in benzene suggests an organic phase complex containing two alkyl phosphoric acid groups and one crown ether per potassium. (ERA citation 05:035229)

CONF-800944-3 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Early Events in Irradiated Water.
J. E. Turner, J. L. Magee, R. N. Hamm, A. Chatterjee, and H. A. Wright. 1980, 15p
Contract W-7405-ENG-26
Symposium on microdosimetry, Oxford, UK, 8 Sep 1980.

We propose a model to continue following events from the initial energy deposition (<10 exp -15 s) through later times at which liquid water can begin to respond chemically to the passage of radiation. We use a Monte Carlo code to calculate the spatial distributions of the chemical species present at times of about 10 exp -11 s. This information provides the necessary input for diffusion-kinetic calculations to predict the subsequent chemical evolution of the system and measurable transient and steady-state yields. Calculations have been made of the correlations of the positions of various chemical species at 10 exp -11 s, the distribution of net charge in volume elements of various sizes, and g-values for various species. These results are presented for water irradiated by 5 keV electrons. (ERA citation 05:035248)

COO-2086-91 PC **A03**/MF **A01**
Wayne State Univ., Detroit, MI. Dept. of Chemistry.
Radiolysis Studies on Reactive Intermediates. Final Report, February 1, 1970-August 31, 1980.
L. Kevan. Aug 80, 44p
Contract AS02-76ER02086

Research highlights are briefly reviewed concerning studies of excess and solvated electrons, development of new electron spin resonance methods for maximizing the geometrical information about the surroundings of paramagnetic species in disordered systems, atom and ion solvation, and studies on other reactive intermediates. Titles of 155 research publications and 182 scientific talks presented on these areas are given. (ERA citation 05:035249)

DOE/ER/00854-27 PC **A02**/MF **A01**
Georgia Univ., Athens. Dept. of Chemistry.
Gas Chromatographic Studies of the Relative Retention of the Sulfur Isotopes in Carbonyl Sulfide, Carbon Disulfide, and Sulfur Dioxide.
J. C. Fetzer, and L. B. Rogers. 18 Jan 80, 17p
Contract AS09-76ER00854

A precision gas chromatograph, coupled to a quadrupole mass spectrometer and an on-line computer, was used to study the fractionation on Porasil A of the exp 32 S/ exp 34 S isotopic pair in a variety of sulfur-containing molecules. Carbonyl sulfide (COS) yielded an average alpha value of 1.00074 +- 0.00017 (standard deviation) for the temperature range 25 exp 0 C to 75 exp 0 C. The carbon disulfide (CS sub 2) value was 1.00069 +- 0.00023 for the range 53 exp 0 C to 103 exp 0 C, and that for sulfur dioxide (SO sub 2) was 1.00090 +- 0.00018 for the range 62 exp 0 C to 112 exp 0 C. Differential thermodynamic data have been reported. A Porapak Q column showed no fractionation of this isotopic pair in these three molecules. (ERA citation 05:035241)

DOE/ER/00854-30 PC **A03**/MF **A01**
Georgia Univ., Athens. Dept. of Chemistry.
Multi-Temperature Gas Chromatography Using Isothermal Columns in Series. Technical Report.
W. A. Spencer, and L. B. Rogers. 11 Aug 80, 38p
Contract AS09-76ER00854

A computer-controlled three-oven gas chromatograph having a multi-position stream-switching valve has been used first to divide a wide-boiling mixture of n-alkanes into three cuts and then to fractionate each cut using a packed column at a different temperature. After initial injection of the sample into the highest temperature column, the low boilers were switched to a low temperature oven. Then, the mid-boilers were switched to a column at an intermediate temperature. For routine repetitive analyses, the multi-oven approach offers an attractive alternative. (ERA citation 05:036983)

DOE/ER/05173-12 PC **A03**/MF **A01**
Maryland Univ., College Park. Dept. of Chemistry.
Non-Destructive Determination of Trace-Element Concentrations. Annual Progress Report.
G. E. Gordon, W. H. Zoller, and W. B. Walters. Aug 80, 42p
Contract AS05-76ER05173

In this year's Report, the neutron-capture prompt gamma -ray activation analysis (PGAA) for trace-element concentrations was used in several new types of samples such as: volcanic samples which included yellow deposits found near volcanoes, fresh ash samples, and suspended particles in plumes from Mt. St. Helens with aircraft; energy related samples which were coal, coal fly ash, oil shale, shale oil and oil; biological samples of freeze-dried blood and liver; neutron-capture cross-sections of borehole samples; and boron in semiconductor silicon. The report includes recommended gamma -ray lines for quantitative determinations, systems improvements of the beam filter system, second sample position and data handling facilities. (ERA citation 05:036971)

DP-1560 PC **A02**/MF **A01**
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab.
Spectrophotometric Determination of Uranium(IV) With Arsenazo III.
E. W. Baumann. Jul 80, 16p

Contract AC09-76SR00001

A spectrophotometric procedure was developed for determining U(IV) in the presence of U(VI) by forming a colored complex with Arsenazo III in 4M HCl. The results compare satisfactorily with U(IV) determinations by ceric titration. Total uranium can be determined after reduction of U(VI) with metallic zinc. The concentration range for the absorbance cell solution is 0 to 2 mu g U(IV)/mL. Other tetravalent ions, such as thorium, zirconium, hafnium, plutonium, and neptunium, will interfere. (ERA citation 05:035225)

EPRI-CS-1513 PC **A12**/MF **A01**
Stanford Univ., CA. Dept. of Civil Engineering.
Adsorption/Coprecipitation of Trace Elements from Water with Iron Oxyhydroxide.
J. O. Leckie, M. M. Benjamin, K. Hayes, G. Kaufman, and S. Altmann. Sep 80, 262p

This study has examined the adsorptive/coprecipitation behavior of several inorganic cations and anions in systems containing freshly precipitated x-ray amorphous iron oxyhydroxide. The project examined experimentally several simple, well-characterized model systems to establish type behavior in sufficient detail to allow interpretation of subsequent experimental work on less well-characterized waste materials. A prominent feature of this project was evaluation of the feasibility of utilizing iron-bearing waste liquids as source materials for the precipitation of amorphous iron oxyhydroxide in trace element removal processes. The roles of complexing ligands and competing metals and ligands, and their significance in controlling the distribution of trace elements at the solution/oxide interface have been characterized. From this research a new semi-quantitative model of oxide surfaces has been proposed, as well as a model to describe adsorption of various metal-ligand complexes. Experimental results indicate the adsorption/coprecipitation process with amorphous iron oxyhydroxide is feasible for removing trace elements from a variety of power plant waste streams. In addition, the feasibility of using an acid-metal cleaning waste containing high concentrations of dissolved iron as the iron source for coprecipitation of trace elements has been confirmed. The adsorptive removal of trace elements from real waste streams in complex systems (real wastes) using either reagent iron sources or acid-metal cleaning waste can be interpreted in terms of the generalized behavior of model systems. Trace elements considered included Zn, Cd, and Cu, selenites, chromates, and arsenates. (ERA citation 05:037179)

FE-2252-15 PC **A08**/MF **A01**
Washington State Univ., Pullman. Dept. of Mechanical Engineering.
Fate of Fuel-Sulfur in Backmixed Combustion Systems. Final Report, August 1979-January 1980.
P. C. Malte, J. C. Kramlich, and W. L. Grosshandler. Jun 80, 170p
Contract AC01-76ET10613

Comprehensive sulfur species measurements were performed on combustion gases in a premixed, jet-stirred reactor containing 0.23 mole % total sulfur. Species measured were H sub 2 S, COS, CS sub 2 , C sub 4 H sub 4 S, SO sub 2 , O sub 2 , CH sub 2 , and C sub 2 H sub 2 by gas chromatography; relative SH and CS and absolute OH by uv absorption spectroscopy; and SO sub 3 by controlled condensation. Reactor fuels were C sub 3 H sub 8 , C sub 2 H sub 2 , CH sub 4 , H sub 2 , and a H sub 2 /CO mixture. Sulfur dopants were C sub 4 H sub 4 S, H sub 2 S, and SO sub 2 . Reactor conditions were 1600 less than or equal to T less than or equal to 1800 exp 0 K, 0.7 less than or equal to PHI less than or equal to 1.7, and 3.5 less than or equal to tau less than or equal to 7 ms. Pressure was 0.9 atm, except for SO sub 3 measurements at 0.9 less than or equal to P less than or equal to 2.9 atm. SO sub 2 was always the dominant product. In fuel-rich flames lacking significant hydrocarbons, H sub 2 S was the stable non-SO sub 2 product sampled - of order 5% yield. In hydrocarbon flames at richer conditions, COS and CS sub 2 replaced H sub 2 S as the non-SO sub 2 product. Kinetic interpretation indicated that internal equilibration of the S-H-O subsystem occurred and that H sub 2 S, COS and CS sub 2 likely formed within the sample probe through reaction of SO. The SO sub 3 measurements, in conjunction with inference of 0-atom concentrations from measured OH, indicated that the reaction SO sub 2 + 0 + M implies SO sub 3 + M predicts SO sub 3 formation provided that a second order pressure limit of 0.3 atm is assumed. A pulverized coal combustion reactor was also used to study the behavior of sulfur. The combustion chamber burned a mass mixture of half propane and half pulverized coal in a recirculating flame with a thermal output of 5 to 9 kW. Temperature and concentrations of SO sub 2 , H sub 2 S, CO, CO sub 2 and O were mapped throughout the combustion chamber for Utah coal burned at fuel-air equivalence ratios of PHI = 0.9, 1.2, and 1.6. (ERA citation 05:037038)

FRNC-TH-866 PC **A07**/MF **A01**
Rennes-1 Univ. (France).
Contribution to the Study of Some Monoethers of Ethylene Glycol and Diethylene Glycol: Thermal Degradation, Effect on Sodium, Application to the Destruction of Contaminated Sodium.
C. Bruneau. 1979, 139p
In French.Thesis.
U.S. Sales Only.

A study was made of the thermal behavior in an inert atmosphere, then in air, of a family of products very much used in industry. These are methyl, ethyl and n-butyl monoethers of ethylene glycol on the one hand and diethylene glycol on the other. Additionally, these compounds were used for studying the destruction of contaminated sodium waste. The study of the destruction of contaminated sodium waste was not restricted to the alcohol-sodium reaction alone, a controllable and non-polluting process was used, permitting the recycling of the organic product used. This study includes a first chapter in which are described the results relating to the pyrolysis and combustion in air of the ethylene glycol and diethylene glycol monoethers quoted and a second chapter in which the various stages of a contaminated metal sodium waste destruction loop are described. (Atomindex citation 11:510252)

INIS-mf-5423 PC **A02**/MF **A01**
Permskii Politekhnicheskii Inst. (USSR).
Chemistry and Chemical Technology. Interinstitute Collection of Papers.
1978, 18p
In Russian.
U.S. Sales Only.

Separate abstracts were prepared for individual papers in scope. (ERA citation 05:036967)

INIS-mf-5453 PC **A04**/MF **A01**
Universidad Autonoma de Zacatecas (Mexico). Escuela de Ciencias Quimicas.
Chemical Effects of the (N, gamma) Reactin in MoCl sub 2.
Tesis (B.Ch.),
M. J. Solache R. 1979, 51p
In Spanish.
U.S. Sales Only.

A contribution is made in the molybdenum radiochemistry, and the possibility to obtain exp 99 Mo of high specific activity throught the Szilard-Chalmers effect was explored. MoCl sub 2 samples were irradiated in the Triga Mark III Reactor of the Mexican Nuclear Center, with an approximated flow of 2.7 x 10 exp 12 neutrons/cm exp 2 , sec. during 15 minutes, the recoil products of the exp 99 Mo were separated by column chromatography using Sephadex G-10 resin and one solution of HCl 1.5N as eluant; the MoCl sub 2 retained in sephadex was oxided to molybdate in order to extract it from the resin, using hydrogen peroxide solution. The two phases radioactivity was measured by gamma spectrophotometry. According to the results the MoCl sub 2 percentage that remains as such is 17 +- 2%. The study of the temperature effect on the fragments of the (n, gamma) reaction in MoCl sub 2 (thermal annealing) was made heating the irradiated samples during half an hour, to different temperatures; the obtained isocrona curve show that the retention was increment as a value of 31.9% to 155 exp 0 C, that value remain constant until 220 exp 0 C, to higher temperature the complex is decomposed. The MoCl sub 2 is not very sensitive to the hydrolysis due to the separation method and presents little tendency to the radiolysis, from the enrichment point of view of exp 99 Mo by the Szilard-Chalmers effect it looks like a good compound since in addition to the mentioned characteristics, the chemical changes under the compound by the (n, gamma) reaction is high. (Atomindex citation 11:516803)

INIS-mf-5589 PC **A06**/MF **A01**
Max-Planck-Inst. fuer Stroemungsforschung, Goettingen (Germany, F.R.).
Quantum Mechanical Reactive Scattering Theory in the Infinite-Order Sudden Approximation Calculations for the System D + HCL Implies H + DCl at 0.53 EV. Report 10/1979.
Diploma thesis,
G. Drolshagen. Jun 79, 116p
In German.
U.S. Sales Only.

This work tries to enlarge and apply the rotational-infinite-order sudden approximation to a three-dimensional reactive system. The complete angular momentum coupling is neglected in the IOS approximation. That means an essential simplification of the calculation; this way also more complicated systems can be treated. The IOS approximation was chosen because it yields good results in inelastic scattering. Furthermore it allows an exact treatment of vibrations that generally are considered important for reactive processes. Additionally the scattering problem can be treated in the IOS approximation is a way quite analogous to collinear scattering. The formalism of collinear scattering is quite well known. The concrete calculation was done for the system D + HCl. (Atomindex citation 11:515178)

INIS-mf-5591 PC **A07**/MF **A01**
Bergen Univ. (Norway). Dept. of Chemistry.
Nuclear Magnetic Resonance Studies on Ethylene and Trimethylene Sulfites and Related Compounds.
Thesis (dr.phil.),
P. Albriktsen. 1977, 135p
U.S. Sales Only.

Following a general introduction the theory and analysis of NMR spectra are discussed, with special reference to the structural determination in the work to be presented, including computer analysis. The interpretation of spectral parameters, proton chemical shifts, C-13 chemical shift, lanthanide induced chemical shifts and ASIS are discussed and the experimental results presented in tabular form. Proton-proton and vicinal coupling constants are discussed for trimethylene sulphites and five-membered sulphites and exp 13 C-H coupling constants for trimethylene sulphites. Finally the conformations of trimethylene sulphites, and ethylene sulphites and analogous five membered ring systems are discussed. In an appendix the experimental procedures are briefly presented, and also the computer programmes available for analysis of NMR spectra. A subroutine CONNOR is briefly presented which is substituted for subroutines in an original programme. Nine previously published papers by the author are also included in the appendix. (Atomindex citation 11:516526)

INIS-mf-5607 PC **A03**/MF **A01**
Amsterdam Univ. (Netherlands).
Negative Chemical Ionization Mass Spectrometry.
Proefschrift (Dr.),
A. L. C. Smit. 23 May 79, 45p
U.S. Sales Only.

This thesis describes some aspects of Negative Chemical Ionization (NCI) mass spectrometry. The reasons for the growing interest in NCI are: (i) to extend the basic knowledge of negative ions and their reactions in the gas phase; (ii) to investigate whether or not this knowledge of negative ions can be used successfully to elucidate the structure of molecules by mass spectrometry. (Atomindex citation 11:515120)

INKA-Conf-79-246-013 PC **A02**/MF **A01**
Umea Univ. (Sweden). Kemiska Institutionen.
Determination of Kinetic Isotope Effects by a Polarimetric Differential Method.
G. Bergson, O. Matsson, and S. Sjoeberg. 1979, 8p CONF-7908113-5

European symposium on organic chemistry, Koeln, F.R. Germany, 20 Aug 1979.
U.S. Sales Only.

The author describes one way of obtaining accurate ratios of rate constants. The method has been worked out in order to determine small kinetic isotope effects like sec. deuterium and carbon isotope effects. The main advantage of the method is that the isotopic species are present in the same reaction mixture, thus eliminating inter-experimental errors. (Atomindex citation 11:516610)

INP-954/PS PC **A02**/MF **A01**
Institute of Nuclear Physics, Krakow (Poland).
Study of Quasielastic Neutron Scattering in Phase 2 of T-Nitrobutane.
J. Mayer, I. Natkaniec, J. Sciesinski, and S. Urban. 1977, 24p
U.S. Sales Only.

A presentation is given of the results of quasielastic neutron scattering (QNS) investigations in phases 2 and 3 of t-nitrobutane (TBN, (CH sub 3) sub 3 CNO sub 2) in the range of momentum transfers from 0.96 to 2.56A exp -1 . The neutron spectra obtained for phase 3 correspond to the spectrometer resolution function, whereas in phase 2 distinct quasielastic broadening is observed. Two models of uniaxial reorientational motion of protons were considered in the QNS pattern analysis, namely, proton jumps by an angle of 120 exp 0 around the C-C axis (CH sub 3 group rotation) and rotations of molecules around the C-N axis. The latter involved two extremes of molecular reorientation: jumps by 120 exp 0 and rotational diffusion. It was ascertained that in TBN phase 2 there exists a stochastic uniaxial reorientation of molecules with a correlation time of about 1.6 x 10 exp -12 sec and the model of 120 exp 0 jumps is preferred. (Atomindex citation 11:515083)

IS-T-896 PC **A08**/MF **A01**
Ames Lab., IA.
Bonding in Scandium Monosulfide a NaCl Crystal Type.
J. A. Merrick. Aug 80, 152p
Contract W-7405-ENG-82
Thesis.

The transition temperature of an order-disorder transition in Sc sub 0 sub 81 S (R anti 3m to Fm3m) occurs at 700 exp 0 C. A group of ordered sublattices on the NaCl-type lattice (Fm3m) was generated and a Madelung energy and configurational entropy were calculated for each sublattice assuming the ions to be Sc exp 2 exp 48+ and S exp 2- . Mean field and pair interaction approximations were used to model long-range and short-range orderings, respectively. The electrostatic model fails to predict the observed short-range and long-range orderings. The high temperature vaporization of ScP was investigated by mass spectrometry and target collection Knudsen effusion at 1767 to 2209K. The composition ScP sub 1 sub 00 vaporizes congruently to the gaseous species Sc, P, and P sub 2 . A temperature independent third law enthalpy of atomization (delta H exp 0 /sub atom,298/ = 252.2 +- 2.8 kcal mole exp -1) has a value approx. 12 kcal larger than that reported for ScS. Nonrelativistic, nonself-consistent LAPW band structure calculations are reported for ScS. XPS and UPS measurements are reported for Sc sub 2 S sub 3 and several compositions Sc/sub 1-x/S (0.0 less than or equal to x less than or equal to 0.2). The Sc and S 2p binding energies (XPS) obtained for the defect scandium monosulfides are very close to those found in the pure elements, suggesting covalent bonding. The Sc 2p energy region has an interesting satellite structure. (ERA citation 05:035234)

Juel-1511 PC **A07**/MF **A01**
Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Nuklearchemie.
Radiation-Induced Lattice Defects and Solid Reactions in Crystalline Complex-Compounds of the Type A sub 2 MX sub 6.
L. Pross. Jun 78, 144p
In German.Thesis.
U.S. Sales Only.

There were radiation-induced lattice defects and solid reactions investigated in crystalline hexahalogen complexes of the type A sub 2 MX sub 6 . The intervenation in the ligand envelope was made by two ways, by radiation-induced collision displacement of the ligands and by metal ion implantation, that can deprive ligands from neighbouring complex ions. The defects were examined by spectroscopical and radiochemical techniques or in an indirect way by the change of the residual covalent bonds of the concerned complexes or new formation of coordination spheres around the implanted metal ion. The results of this work show the tendency of the A sub 2 MX sub 6 lattice to keep its conditions of bonds and structure at an even extreme radiation load. (Atomindex citation 11:515224)

LA-8251-MS PC **A11**/MF **A01**
Los Alamos Scientific Lab., NM.
Atlas of Uranium Emission Intensities in a Hollow Cathode Discharge.
B. A. Palmer, R. A. Keller, and R. Engleman, Jr. Jul 80, 242p
Contract W-7405-ENG-36

The uranium emission spectrum from a hollow cathode discharge is displayed from 11,000 to 26,000 cm exp -1 . This atlas lists 4928 spectral lines of uranium; 3949 are classified to the neutral spectrum and 431 are classified to the singly ionized spectrum. Listed wavenumbers are accurate to +-0.003 cm exp -1 and the listed relative intensities to +-8%. The richness of the spectrum makes this atlas useful for wavenumber calibration of lasers, spectrographs, and monochromators to an accuracy of 1 part in 10 exp 7 . This atlas is also useful as a guide to the uranium spectrum, and relative oscillator strengths (gf values) can be calculated from the intensities to a precision of +-20%. (ERA citation 05:035681)

LA-8399 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Separation of Trace Uranium from Plutonium for Subsequent Analysis.
S. F. Marsh. Aug 80, 5p
Contract W-7405-ENG-36

Trace uranium quantities are separated from plutonium metal and plutonium oxide for subsequent analysis. Samples are dissolved in hydrobromic acid or a hydrobromic acid-hydrofluoric acid mixture. The U(VI)-halide complex is separated from nonsorbed Pu(III) on an anion exchange column using sequential washes of 9M HBr, a 0.1M HI-12M HCl mixture and 0.1M HCl. (ERA citation 05:035231)

LA-8460-MS PC **A05**/MF **A01**
Los Alamos Scientific Lab., NM.
Neutron Multiplication Corrections for Passive Thermal Neutron Well Counters.
M. S. Krick. Jul 80, 93p
Contract W-7405-ENG-36

Various techniques are surveyed for the neutron-multiplication correction of plutonium assays using thermal neutron coincidence counters. Examples are presented for a wide range of plutonium samples. Calculator programs for use with the High-Level Neutron Coincidence Counter (HLNCC) are described. (ERA citation 05:035219)

LBL-11392 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Reaction Interface in Reduction.
M. Chang, and L. C. De Jonghe. Jul 80, 10p
CONF-800765-2
Contract W-7405-ENG-48
LLR/MMRD international symposium of interfaces in glass-metal systems, Berkeley, CA, USA, 28 Jul 1980.

When an oxide such as cobalt ferrite is reacted with hydrogen, a porous metal scale will form topochemically from its surface. The pores in the metal scale permit the reducing gas to reach the reaction interface directly. At the pore bottoms the parent oxide is then destroyed by the reduction process, the oxygen is removed in the form of water vapor, and the cations that are produced at the pore bottoms are transported to the adjacent metal phase. The purpose of the present paper is to clarify the processes occurring at the metal/oxide reaction interface, and to determine which subprocesses are most important in determining the interface reaction rates. (ERA citation 05:036953)

N81-10135/4 PC **A05**/MF **A01**
Max-Planck-Institut fuer Stroemungsforschung, Goettingen (Germany, F.R.).
Study of the Reactions of the Hydroperoxyl Radical with an ESR, Lmr Spectrometer Untersuchung von Reaktionen des Hydroperoxyiradikals MIT Hilfe Eines Kombinierten ESR-Lmr-Spektrometers.
Thesis.
F. Temps. Aug 79, 83p MPIS-16/1979
Text in German.

Reaction rates of O + HO2 yields OH + O2, NO + HO2 yields OH + NO2 were determined in an isothermic flow with an electron spin resonance and a laser magnetic resonance spectrometer. The simultaneous determination of the atom and radical concentration time profile was possible. The HO2 radicals for the first were produced from F + H202 yields HO2 + HF. The value of the velocity constant K sub 1 (298 K) is 2.0 + or - 0.6 X 10 to the 13th power cu cm moles. The radicals HO2 for NO + HO2 yields OH + NO2 were produced from the reactions F + H202 yields HO2 + HF, and H + O2 + M yields HO2 + M. The resulting value of the reaction rate is k sub 2 (298 K) = (4.4 + or - 1.0 X 10 to the 12th power cu cm/moles. This value seems to be independent of the pressure between 3 mbar and 17 mbar.

N81-10615/5 PC **A21**/MF **A01**
Ohio State Univ., Columbus. Dept. of Physics.
The Spectrum of N2O Between 800 and 5200 cm(-1).
Interim Technical Report.
R. L. Hawkins, R. J. Nordstrom, and J. H. Shaw. Sep 80, 489p NASA-CR-163671
Grant NSG-7479

An atlas of N2O lines between 800 and 5200/cm obtained from low-pressure, long-path-length samples at 296K is presented. Many of the line centers were marked and their positions were tabulated. The peak absorptances of the weaker lines in the atlas are similar to those expected in an extreme path through the atmosphere.

N81-10824/3 PC **A03**/MF **A01**
Stockholm Univ. (Sweden). Inst. of Physics.
An Analysis of Hyperfine Interactions in the Electronic Spectrum of AlF. Part 2: Wave Numbers and Examples of Intensity Profiles.
J. M. Brown, I. Kopp, C. Malmberg, and B. Rydh. Oct 79, 48p USIP-79-15

Nine singlet and seven triplet states assigned to the ALF (+ +) molecule were investigated and ordered into a common energy scheme. The transitions b-a and c-a were studied. The wave numbers are given in table form. The calculation procedure for transition between individual F states was described in part one.

ORO-3861-35 PC **A03**/MF **A01**
Tennessee Univ., Knoxville. Dept. of Physics.
Vacuum Ultraviolet Electronic Properties of Liquids. Progress Report.
L. R. Painter. Jun 80, 27p
Contract AS05-76EV03861

A program to study the electronic structure of liquids over the energy range from 2 to 25 eV was carried out from November, 1968 to October 1980. These studies basically consisted of measuring the reflectance, transmittance, photoionization, and photoemission of liquids in the vacuum ultraviolet spectral region as a function of angle of incidence and photon energy. Such measurements are analyzed to yield the optical and dielectric functions of the liquid as functions of photon energy. A summary of the progress in the program is presented. (ERA citation 05:035674)

PB81-116782 Not available NTIS
National Bureau of Standards, Washington, DC.
Wavelengths and Energy Levels of Quadruply Ionized Magnesium (Mg v).
Final rept.,
V. Kaufman, and M-C. Artru. Sep 80, 5p
Pub. in Jnl. Opt. Soc. Am. 70, n9 -1135-1139 Sep 80.

The spectrum of Mg(+4) was observed between 95 and 400 A. New wavelengths result in revised-energy level values and some resolved term struc-

ture. Parametric calculations with configuration interaction were made for the 2s 2 quintuplet p,2 doublet s 2 triplet p 3s, and 2 doublet s 2 triplet p 3d configurations. These support rejection of some levels and some new identifications.

PB81-116964 Not available NTIS
National Bureau of Standards, Washington, DC.
Neutron Inelastic Scattering Study of C2H4 Adsorbed on Raney Nickel,
R. D. Kelley, R. R. Cavanagh, J. J. Rush, and T. E. Madey. 1980, 4p
Sponsored in part by Department of Energy, Washington, DC.
Pub. in Surface Science 97, pL335-L338 1980.

The authors report here the use of neutron inelastic scattering (NIS) in a study of the chemisorption of ethylene on a high area Raney Ni catalyst. In this preliminary account, a reduced Raney Ni sample was exposed to C2H4 at 143K, warmed to 300K, and subsequently cooled to 77K for the measurement of the vibrational loss spectrum.

PB81-118465 Not available NTIS
National Bureau of Standards, Washington, DC.
Wavelength and Vibrational-State Dependence of Photoelectron Angular Distributions. Resonance Effects in 5 sigma Photoionization of CO.
Final rept.,
B. E. Cole, D. L. Ederer, R. Stockbauer, K. Codling, and A. C. Parr. Jun 80, 3p
Pub. in Jnl. Chem. Phys. 72, n11 p6308-6310 Jun 80.

Vibrationally resolved photoelectron angular distributions are reported for the 5 sigma channel of CO. The wavelength dependence of the angular distributions of the first four vibrational levels were obtained at 0.5 eV intervals over a photon energy range of 16 to 26 eV. The instrument used monochromatized from the light NBS synchrotron storage ring (SURF) to photoionize CO molecules in the gas phase. The photoelectron angular distributions were measured by rotating a spherical analyzer. The variation in the angular distributions of the different vibrational states as a function of photon energy is interpreted as arising from autoionization in the low energy range and from shape resonance effects in the high energy range.

PB81-118481 Not available NTIS
National Bureau of Standards, Washington, DC.
High-Purity 4-Nitrophenol: Purification, Characterization, and Specifications for Use as a Spectrophotometric Reference Material.
Final rept.,
G. N. Bowers, Jr., R. B. McComb, R. G. Christensen, and R. Schaffer. 1980, 6p
Pub. in Clin. Chem. 26, n6 p724-729 1980.

The authors describe specifications for high-purity 4-nitrophenol, which is suitable for spectrophotometric standardization. Such a reference material is needed in clinical enzymology to establish the proper molar absorptivity of 4-nitrophenol under final reaction conditions, particularly for measuring alkaline phosphatase activity in human serum. Some lots of 4-nitrophenol available commercially met these specifications, but several did not. The latter can be purified to meet our specifications by recrystallization or sublimation. The molar absorptivity of 4-nitrophenol (35 micromole/L) in 10 mmol/L NaOH at 25C at 401 nm is 18 380 plus or minus 90 L/mol/cm.

PB81-118499 Not available NTIS
National Bureau of Standards, Washington, DC.
Additions to the Analysis of Al VI.
Final rept.,
M-C. Artru. Sep 80, 6p
Pub. in Jnl. Opt. Soc. Am. 70, n9 -1130-1135 Sep 80.

The spectrum of five-times ionized aluminum was investigated in the 85-113 A and 100-1500 A wavelength regions. New energy levels were found in the 2 doublet s 2 triplet p3s 3p, and 3d configurations. Parametric calculations were made for the 2 doublet s 2 triplet p 3p configuration. They were also done for the interacting 2 doublet s 2 triplet p 3s, and 2 doublet s 2 triplet p 3d configurations in both Na IV and Al VI. The results are compared with similar calculations in Mg V.

PB81-118556 Not available NTIS
National Bureau of Standards, Washington, DC.
Fifty Years of International Cooperation on the Properties of Steam.
Final rept.,
H. J. White, Jr. 1980, 7p
Pub. in Proc. Int. Conf. Properties of Steam (9th) held at Munich (Germany, F.R.) Sep 10-14, 1979. Paper in Water and Steam, Their Properties and Current Industrial Applications, p18-24 1980.

Since the 1st International Conference on the Properties of Steam was held in London in 1929, the current 9th International Conference on the Properties of Steam marks the golden jubilee of cooperative international steam research. It is, therefore, a fitting time for a look at research and the preparation of critically evaluated reference data on steam from an historical point of view. A brief summary will be given of the International Conference, the activities generated by them, and the development of the International Association for the Properties of Steam, which now serves to organize the International Conference, provide continuity between conferences, and encourage and coordinate research on the properties of steam and on the chemistry of steam power cycles.

PB81-118598 Not available NTIS
National Bureau of Standards, Washington, DC.
The Use of Standard Reference Materials for Quality Assurance of Environmental Measurements,
G. A. Urino. 1979, 8p
Pub. in Proc. Natl. Conf. on Quality Assurance of Environmental Measurements, Denver, CO, Nov 27-29, 1978, p23-30 (Information Transfer, Inc., 9300 Columbia Blvd., Silver Spring, MD 20910, 1979).

Standard Reference Materials (SRM's) are well characterized, homogeneous, materials with specific properties such as chemical composition measured and certified by the National Bureau of Standards (NBS). Approximately 75 environmental SRM's are now available for use in various applications including: (1) calibration of instruments and measurement systems; (2) measurement quality control; and (3) assurance of long-term interlaboratory measurement compatibility. SRM's are also used to provide a reliable measurement base for the development and enforcement of environmental regulations. Available environmental SRM's now include: (1) a variety of analyzed gas mixtures used in applications involving monitoring of stationary sources, ambient air, and motor vehicle emissions; (2) a series of trace element standards for analyzing various matrices such as fuel oil, coal, fly ash, water as well as botanical and biological materials and (3) a number of materials certified for radio-nuclide activity used for calibration of counting instruments. This paper describes briefly, the procedures used by NBS to certify SRM's and the role of SRM's in Environmental Measurement Systems. Also given are a number of specific examples of the use of existing SRM's in environmental measurement applications. The environmental SRM's currently available from NBS are described as are NBS plans for the production of new environmental SRM's.

PB81-118911 PC **A11**/MF **A01**
Environmental Monitoring Systems Lab., Research Triangle Park, NC. Quality Assurance Div.
Evaluation of Ozone Calibration Procedures.
Final rept.,
Kenneth A. Rehme, John C. Puzak, Michael E. Beard, and C. Frederick Smith. Nov 80, 227p
EPA-600/4-80-050

In October of 1976, the U.S. Environmental Protection Agency announced that the calibration procedure then currently in use for reference methods for the measurement of ozone in the atmosphere -- the neutral buffered potassium iodide procedure -- had been found variable and in some cases inaccurate and would be discarded. Four alternative calibration methods would be investigated as possible replacements: the ultraviolet photometry procedure, the gas phase titration with excess nitric oxide procedure, the gas phase titration with excess nitric oxide procedure, the gas phase titration with excess ozone procedure, and the boric acid-potassium iodide procedure. This publication summarizes the evaluation effort of the U.S. Environmental Protection Agency to select an alternative calibration procedure. Each method was subjected to a preliminary investigation to review the procedural descriptions and to assess the critical performance parameters. Variability studies were subsequently conducted to estimate the precision and accuracy of ozone calibrations using the four methods. The results of these studies were then compared. The ultraviolet photometry procedure was determined to be the most dependable and accurate and was designated the replacement procedure.

PB81-119414 Not available NTIS
National Bureau of Standards, Washington, DC.
Atmospheric Particulate Measurement Development at the National Bureau of Standards.
Final rept.,
W. Cassatt. 1979, 3p
Pub. in Proceedings of the Annual Technical Meeting, 'Learning to Use Our Environment' (25th) Held at Seattle, WA. on April 30-May 2, 1979, p275-277 1979.

The atmospheric particulate measurement development efforts at the National Bureau of Standards focus upon three areas, namely experimental measurement techniques, Standard Reference Materials (SRM's) and theory. Areas of application that are addressed by Bureau scientists in their atmospheric particulate measurement research include smoke particle characterization, the sizing of particles produced by aerosol generators, the calibration of fine particle detectors, standards for urban dust analysis, chemical characterization of bulk samples or discrete particles collected from atmospheric aerosols, and the investigation of resonance absorption of light by micrometer size particles.

PB81-119679 MF **A01**
National Research Council, Washington, DC.
Petroleum in the Marine Environment.
Jan 75, 120p ISBN-0-309-02311-4
Proceedings of a Workshop on Inputs, Fates, and the Effects of Petroleum in the Marine Environment, Airlie, Virginia, May 21-15, 1973. Library of Congress catalog card no. 74-18572.
Paper copy available from: National Academy of Sciences, 2101 Constitution Avenue, N.W., Washington, DC. 20418. PC $9.00.

Provides a comprehensive assessment of existing information in this crucial area of ocean research, indicating gaps in knowledge and suggesting directions for new investigation on the fates and effects of petroleum hydrocarbons (PHCs) in the oceans. Discussions include primary sources of oil pollution, estimated amounts of hydrocarbons entering the seas each year, analytical methods for measuring effects of PHCs, and known adverse effects of PHCs on aquatic organisms; populations, communities, and human populations.

PB81-125809 PC **A06**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
Interactive Fortran IV Computer Programs for the Thermodynamic and Transport Properties of Selected Cryogens (Fluids Pack).
Technical note,
R. D. McCarty. Oct 80, 116p NBS-TN-1025
Sponsored in part by National Aeronautics and Space Administration, Houston, TX. Lyndon B. Johnson Space Center.

The thermodynamic and transport properties of selected cryogens have been programmed into a series of computer routines. Input variables are any two of P, rho or T in the single phase regions and either P or T for the saturated liquid or vapor state. The output is pressure, density, temperature, entropy, enthalpy for all of the fluids and in most cases specific heat capacity and speed of sound. Viscosity and thermal conductivity are also given for most of the fluids. The programs are designed for access by remote terminal; howeve, they have been written in a modular form to allow the user to select either specific fluids or specific properties for particular needs. The program includes properties for hydrogen, helium, neon, nitrogen, oxygen, argon, and methane. The programs include properties for gaseous and liquid states usually from the triple point to some upper

limit of pressure and temperature which varies from fluid to fluid. Computer listings of the Fortran four codings are presented. Copies of the programs may be obtained from either the Thermophysical Properties Division of the National Bureau of Standards at Boulder, Colorado, or from Walter Scott at the NASA-Johnson Space Center in Houston, Texas.

PB81-125833 PC **A06**/MF **A01**
National Bureau of Standards, Washington, DC.
Bibliography on Atomic Energy Levels and Spectra.
Interim rept. Jul 75-Jun 79,
Romuald Zalubas, and Arlene Albright. Oct 80, 124p NBS/SP-363-SUPPL-2
Errata sheet inserted. See also report dated Jan 77, PB-263 199. Library of Congress catalog card no. 80-600055.

This is the second supplement to NBS Special Publication 363, Bibliography on Atomic Energy Levels and Spectra, July 1968 through June 1971. Supplement 1 covered the period from July 1971 through June 1975, and this bibliography covers the literature from July 1975 through June 1979. It contains approximately 1200 references classified by subject for individual atoms and atomic ions. A number index identifies the references. An author index is included. References included contain data on energy levels, classified lines, wavelengths, Zeeman effect, Stark effect, hyperfine structure, isotope shift, ionization potentials, or theory which gives results for specific atoms or atomic ions.

RFP-Trans-288 PC **A02**/MF **A01**
Spectral Method for Determination of Impurities in Vanadium Pentoxide.
P. M. Poliakov, and A. K. Rusanov. 1955, 8p
Contract AC04-76DP03533
A, Fizicheskie Metody Issledovaniia n9 P1070-1075 1955.

In this report it is shown that quantitative and qualitative analysis of impurities in vanadium pentoxide can be successfully achieved with proper selection of conditions for specimen vaporization and excitation of atoms. Spectrographs with moderate dispersion, e.g., the quartz ISP-22 and the glass ISP-51 with a focal length of 270 mm are suitable for this purpose. Procedures for determining aluminum, iron, magnesium, manganese, silicon, copper, antimony, lead, bismuth, arsenic, cadmium, zinc, and phosphorus are given. (ERA citation 05:036979)

SAND-80-1309 PC **A05**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Description of CORSET: a Computer Program for Quantitative X-Ray Fluorescence Analysis.
F. V. Stohl. Aug 80, 92p
Contract AC04-76DP00789

Quantitative x-ray fluorescence analysis requires a method of correcting for absorption and secondary fluorescence effects due to the sample matrix. The computer program CORSET carries out these corrections without requiring a knowledge of the spectral distribution of the x-ray source, and only requires one standard per element or one standard containing all the elements. Sandia's version of CORSET has been divided into three separate programs to fit Sandia's specific requirements for on-line analysis in a melt facility. The melt facility is used to fabricate new alloys with very variable compositions and requires very rapid analyses during a run. Therefore, the standards must be analyzed several days in advance. Program DAT1 is used to set up a permanent file consisting of all the data related to the standards. Program UNINT is used to set up a permanent file with the intensities, background counts and counting times of the unknowns. Program CORSET uses the files created in UNINT and DAT1 to carry out the analysis. This report contains descriptions, listings, and sample runs for these programs. The accuracy of the analyses carried out with these three programs is about 1 to 2% relative with an elemental concentration of about 10 wt %. (ERA citation 05:036978)

SAND-80-6020 PC **A02**/MF **A01**
Thermochemistry of the Aluminothermic Process.
Y. L. Pliner. 1970, 10p
Contract AC04-77DP00789
A, Sb. Tr. Chelyabinsk. Elektrometall. Komb. n2 P99-103 1970.

This paper examines the possibility of establishing a correlation between the heat of reaction by Al with various metal oxides and the temperature of the reaction products. Complete and incomplete reduction and thermal losses are considered. (ERA citation 05:037003)

Y/DK-255 PC **A03**/MF **A01**
Oak Ridge Y-12 Plant, TN.
Analysis of Selected Organic Priority Pollutants in Environmental Samples.
R. J. McElhaney, and M. L. Mann. 26 Sep 80, 37p CONF-801044-1
Contract W-7405-ENG-26
24. conference on analytical chemistry in energy technology, Gatlinburg, TN, USA, 7 Oct 1980.

The analysis of drinking water for pesticides, herbicides, and volatile organic compounds will probably be the environmental analytical chemist's introduction to the Environmental Protection Agency (EPA) list of organic priority pollutants. The State of Tennessee requires that drinking water be monitored for lindane, endrin, methoxychlor, toxaphene, 2,4-D, silvex, and the trihalomethanes (THM). In the past two years our attention has been particularly focused on the analysis of polyclorinated biphenyl (PCB) in an increasingly wide variety of sample types. This paper will describe the Oak Ridge Y-12 Plant Laboratory's experience in the analysis of environmental samples for these particular organic priority pollutants by gas chromatography with electron capture detection. Preparation and cleanup procedures for many sample types, chromatographic interpretation, column selection, and confirmatory tests will be discussed and evaluated. (ERA citation 05:037180)

8. EARTH SCIENCES AND OCEANOGRAPHY

8A. Biological Oceanography

DOE/EV/04706-7 PC **A08**/MF **A01**
Manomet Bird Observatory, MA.
Distribution of Marine Birds on the Mid- and North-Atlantic US Outer Continental Shelf. Technical Progress Report, January 1978-July 1980.
K. D. Powers, G. L. Pittman, and S. J. Fitch. Sep 80, 174p
Contract AS02-78EV04706

The species composition, distribution, and abundance of marine birds on continental shelf waters from Cape Hatteras to the Bay of Fundy were examined using ships-of-opportunity. Northern Fulmar, Cory's Shearwater, Greater Shearwater, Sooty Shearwater, Wilson's Storm-Petrel, Gannet, Red Phalarope, Great Black-backed Gull, Herring Gull, and Black-legged Kittiwake were the most abundant and common species. These species were ecologically dominant within the bird community in numbers and biomass. Georges Bank and Gulf of Marine regions generally had greatest estimates of standing stock and biomass; whereas, in the Middle Atlantic region these estimates were consistently lowest. Species diversity throughout the study area was greatest in spring and least in fall. Oceanic fronts at the continental shelf break and at Nantucket Shoals influenced the distribution of Wilson's Storm-Petrels and Red Phalaropes. Fishing activities were particularly important to Larus gull distribution. Fishes, squids, and crustaceans were the most important groups of prey items in diets of nine bird species. An oiled bird or pollution index was developed. According to the index, frequency of oiled birds was greatest in winter and spring, and gulls made up the majority of species with oiled plumages. (ERA citation 05:037171)

PB81-116451 PC **A04**/MF **A01**
Gulf States Marine Fisheries Commission, Ocean Springs, MS.
Fishery Profiles of Red Drum and Spotted Seatrout.
Rept. no. 6,
William S. Perret, James E. Weaver, Roy O. Williams, Patricia L. Johansen, and Thomas D. McIlwain. Sep 80, 68p NOAA-80100105
Contract NOAA-03-78-D08-0029

The red drum (Sciaenops ocellata) and the spotted seatrout (Cynoscion nebulosus) support valuable commercial and recreational fisheries along the northern Gulf Coast. This study describes life cycles and biology of these fish, information on spawning grounds, on natural and fishing mortality rates, on proper identification of nursery areas and on population dynamics and yield models. It also describes the social, economic, and political factors that enter management decisions.

PB81-118317 PC **A06**/MF **A01**
Gulf States Marine Fisheries Commission, Ocean Springs, MS.
A Menhaden Bibliography (Formalization of a Menhaden Information Data Bank),
Donna D. Fontenot, Richard E. Condrey, and Theodore B. Ford. Sep 80, 121p NOAA-80100101
Contract NOAA-03-78-D08-0029
Prepared in cooperation with Louisiana State Univ., Baton Rouge. Center for Wetlands Resources.

This document is a listing of the computerized bibliography compiled to determine the location and accessibility of information pertaining to the biological, social, economic and other factors of importance to the Gulf Menhaden Fishery. The bibliography was computerized by utilizing the 'Famulus' software program. In computerizing the bibliography, each reference was divided into 5 fields: author, date, title, journal or publisher, and location of the reference.

PB81-119174 PC **A02**/MF **A01**
Gulf States Marine Fisheries Commission, Ocean Springs, MS.
Tagging Mortality and Tag Shedding of Juvenile Gulf Menhaden, 'Brevoortia patronus',
James Byars. Sep 80, 21p NOAA-80100108
Contract NOAA-03-78-D08-0029
Prepared in cooperation with Louisiana Dept. of Wildlife and Fisheries, Grand Terre Island. Marine Research Lab.

This study measured the differences in tag shedding and tagging mortality rates among size classes of juvenile Gulf menhaden and between taggers for each of two tag sizes. There were significant differences in tag losses among the size classes of menhaden tested in the field experiment where 50-69 mm fish experienced almost total mortality. A successful system for holding menhaden for laboratory experiments is also described.

PB81-120313 PC **A04**/MF **A01**
North Carolina Univ. at Wilmington. Dept. of Biology.
Natural and Dredged Material Nesting Habitats of Gull-Billed Terns, Common Terns and Black Skimmers in North Carolina,
Steven H. Everhart, James F. Parnell, Robert F. Soots, Jr., and Phillip D. Doerr. May 80, 52p UNC-SG-79-05, MARINE SCIENCES CONTRIB-932, NOAA-80101508
Grant NOAA-04-6-158-44054
Prepared in cooperation with Campbell Univ., Buies Creek, NC. Dept. of Biology.

In North Carolina all colonies of Gull-billed Terns (Gelochelidon nilotica), Common Terns (Sterna

hirundo), and Black Skimmers (Rynchops niger) were visited during the 1976 and 1977 nesting seasons. The majority of the nests of all three species were placed on dredged material sites. The habitats of natural and dredged material sites were characterized as to: distance to open areas, water, grass and shrubs; height and percent cover of vegetation; plant species present; substrate; general and microtopography; and elevation and shape. It appeared that dredged material sites were similar to natural habitat, except that dredged material sites were usually more elevated. Possible reasons for the historical shift from traditional natural colony sites to dredged material sites by these species are presented and discussed.

PB81-124513 PC **A24**/MF **A01**
National Marine Fisheries Service, Seattle, WA. Northwest and Alaska Fisheries Center.
Summary of Northern Fur Seal Data and Collection Procedures. Volume 2. Eastern Pacific Pelagic Data of the United States and Canada (Excluding Fur Seals Sighted).
Technical memo.,
Robert H. Lander. Sep 80, 557p NOAA-TM-NMFS-F/NWC-4, NOAA-80101001
See also Volume 1. PB81-106502. Prepared in cooperation with Nortn Pacific Fur Seal Commission Headquarters, Washington, DC.

This is the second of several reports being produced as a result of the Seattle Data Workshop which the Standing Scientific Committee of the North Pacific Fur Seal Commission convened in December 1978. In a form suitable for population analyses, the Commission assembles here much of the detailed data collected by Canada and the United States during 1958-74 while carrying out research cruises in the eastern North Pacific region under the 1957 Convention. Data tables are preceded by an explanatory text in an effort to guard against unwarranted assumptions in population studies. Records of fur seal sightings and effort are not included, nor are the data on tagged or marked animals which are planned for a future report. The following biological data are summarized in the report: age and sex composition, pregnancy rates, reproductive condition of females, length and weight, and food species consumed.

PB81-125874 PC **A05**/MF **A01**
National Marine Fisheries Service, Seattle, WA.
Marine Fisheries Review. Volume 42, Number 3-4, March-April 1980.
Apr 80, 93p NOAA-80100811
See also Volume 42, Number 1, PB80-213754.

This issue contains the papers presented at a symposium held in Seattle, Washington on 6-7 July 1978. The titles of some of the papers are: Cooperative Survey of Rockfish and Whiting Resources Off California, Washington, and Oregon, 1977: The Distribution, Abundance, and Biological Characteristics of Pacific Whiting; Short-belly Rockfish: A Large Unfished Resource in Waters Off California; Abundance, Size and Age Composition, and Growth of Pacific Ocean Perch; Stock Separation of Five Rockfish Species Using Naturally Occurring Biochemical Genetic Markers; Maturation and Fecundity of Four Species of Sebastes; Morphology and Distribution Patterns of Several Important Species of Rockfish; etc.

8B. Cartography

PB81-120560 PC **A06**/MF **A01**
Geological Survey, Tacoma, WA. Water Resources Div.
Semi-Variogram Estimation and Universal Kriging Program (Computer Program Documentation User's Manual),
James A. Skrivan, and Michael R. Karlinger. Apr 80, 103p USGS/WRD/WRI-80/064

Computer program K603 contains procedures needed in the stochastic-interpolation algorithm known as universal kriging, as originally described by G. Matheron. By specifying a theoretical semivariogram and functional terms of an assumed underlying trend, or drift, kriging provides unbiased estimates of variables in neighborhoods of autocorrelation. Given single observations and their spatial distribution in two dimensions, the technique yields point estimates and point-estimate variances at arbitrary locations. In the absence of measurement errors, which can be incorporated in the analysis, kriging is an exact interpolator. The program includes four options used in kriging: (1) semi-variogram estimation; (2) universal kriging for optimization of the drift-semi-variogram set; (3) universal kriging for arbitrary-point or block estimation; and (4) universal kriging for drift-coefficient estimation.

8C. Dynamic Oceanography

AD-A091 046/3 PC **A14**/MF **A01**
Washington Univ., Seattle. Dept. of Oceanography.
Forced Internal Waves in the Arctic Ocean.
Final rept.,
James Howe Morison. May 80, 307p Rept no. REF-M80-10
Contracts N00014-75-C-0186, N00014-79-C-0024
Doctoral thesis.

When the surface of an ocean is disturbed by the effects of a storm, motions may be excited in the pycnocline by the action of forced internal waves. This dissertation deals with experimental and theoretical studies of such motions. During the Arctic Mixed Layer Experiment in the Spring of 1976, manifestations of forced internal waves were observed with a new profiling current meter-CTD system. The device is unique in that it is capable of producing simultaneous, accurate profiles of density and horizontal velocity, repeatedly and at high frequency. Of particular interest are measurements made with the instrument in the upper 80 m of the ocean during a small storm which occurred April 8, 1976. During the storm the isopycnals deflected downward about 2 m and then rebounded and oscillated with periods on the order of 5 to 10 hous. Horizontal velocity perturbations at about the inertial frequency were also excited by the storm. In an effort to explain the observed motions, new theories were developed which deal with the forcing of internal waves by surface stress, atmospheric pressure and buoyancy flux. Solutions are derived for the forced motions as sums of internal wave normal modes. Arbitrary stratification is allowed below the surface mixed layer and the kinematic surface boundary condition is used.

AD-A091 174/3 PC **A03**/MF **A01**
Coastal Engineering Research Center, Fort Belvoir, VA.
Estimating Nearshore Conditions for Irregular Waves.
Technical paper,
William N. Seelig, and John P. Ahrens. Jun 80, 48p Rept no. CERC-TP-80-3

Methods for estimating nearshore irregular wave conditions for the case of continuously shallowing bottom contours, given the bottom slope and offshore wave characteristics, are presented. The methods are based on the work of Goda, Takayama, and Suzuki. A sensitivity analysis is performed to show the influence of various input parameters on predicted nearshore significant wave height. The methods are applied to the nearshore region at the CERC Field Research Facility at Duck, North Carolina, and results are compared to observed nearshore wave height changes measured at the facility. Design curves are included.

AD-A091 200/6 Not available NTIS
Massachusetts Inst. of Tech., Cambridge. Ralph M. Parsons Lab. for Water Resources and Hydrodynamics.
Forward Diffraction of Stokes Waves by a Thin Wedge,
Dick K. P. Yue, and Chiang C. Mei. 18 May 79, 20p
Distribution: Pub. in Jnl. of Fluid Mechanics, v99 pt1 p33-52 1980 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A091 201/4 Not available NTIS
Massachusetts Inst. of Tech., Cambridge. Dept. of Civil Engineering.
Forward Scattering by Long Thin Bodies,
Chiang C. Mei, and E. O. Tuck. 25 Jan 79, 14p
Grant NSF-GK-43886X
Distribution: Pub. in SIAM Jnl. of Applied Mathematics, v39 n1 p178-191 Aug 80 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A091 227/9 PC **A04**/MF **A01**
Woods Hole Oceanographic Institution, MA.
The High Energy Benthic Boundary Layer Experiment. Proceedings of the Keystone III Conference, Held at the Keystone Center for Continuing Education, March 11-15, 1980.
Annual rept. no. 3,
Charles D. Hollister, Arthur R. M. Nowell, and J. Dungan Smith. Jul 80, 54p Rept no. WHOI-80-32
Contract N00014-79-C-0071

A meeting was held March 11-15, 1980, to develop and refine the hierarchy of problems to be addressed by the high energy benthic boundary layer experiment. This document outlines revised program goals and the critical scientific tasks needed to attain those goals. Also included in an interim 'state of the program' report and a critical review by the Advisory Committee. (Author)

AD-A091 339/2 Not available NTIS
SACLANT ASW Research Centre, La Spezia (Italy).
Variability in the Gulf of Cadiz: Internal Waves and Globs,
James L. Cairns. 24 Aug 79, 20p Rept no. SACLANTCEN-SR-39
Availability: Pub. in Jnl. of Physical Oceanography, v10 n4 p579-595 Apr 80 (No copies furnished by DTIC/NTIS).

No abstract available.

PB81-116436 PC **A14**/MF **A01**
Tetra Tech, Inc., Pasadena, CA.
Tsunamis (Proceedings of the National Science Foundation Workshop Held at Trabuco Canyon, Southern California on May 7-9, 1979),
Li-San Hwang, and Y. Keen Lee. May 79, 317p NSF/RA-790530
Grant NSF-PFR78-05646

The purpose of this workshop was to provide a forum for a critical review of the status of tsunami research. The program sessions offered presentations to analyze six main topics: tsunamigenic earthquakes; tsunami generation; tsunami propagation; coastal transformations and terminal effects; numerical aspects of tsunami modeling; and coastal protection. Tables, graphs, and maps supplement the text.

PB81-120644 PC **A03**/MF **A01**
Nova Univ. Ocean Science Center, Dania, FL.
Surface Current - Transport Correlations in the Florida Current.
Final technical rept.,
Irving Brooks. 1980, 29p NOAA-80101003

Dropsonde data from two sections in the Straits of Florida were examined in search of a correlation between surface current and total mass transport. The surface current distribution was subjected to: (1) cross-stream integration with and without corrections due to wind effects, (2) cross-stream integration including cross-stream weighting functions, and (3) division of the transects into different regimes based on the position of the axis of the current. Under none of these conditions was a correlation found which was both statistically reliable and physically reasonable.

8E. Geodesy

AD-A090 852/5 PC **A03**/MF **A01**
Army Engineer Topographic Labs, Fort Belvoir, VA.
Geodetic Applications of Inertial Navigation Systems,
Edward F. Roof. 1977, 31p

Presented at ASCE Spring Convention and Exhibit, Dallas, TX., 25-29 Apr 77, Preprint 2888. See also AD-A067 179.

The most dominate error source in position determinations are in poor calibration procedures, misalignment of the accelerometers about their axes (platform drift and deflections of the vertical) and unnecessary shocks and vibrations to the system. An analysis of data in the gravity tables show that the system is capable of measuring delta g with an RMS of slightly better than 2 micro gs and that these measurements could be improved with a decrease of heading sensitivity by the system. An analysis of the data in the tables for the deflections of the vertical show that the data is highly influenced by the change in gyro drift rates as a result of heading changes of the system. When the system operates along a fairly straight line (small azimuth changes) deflections of the vertical can be determined with a RMS of one and one half seconds or better. It is believed that the following changes would improve the operations of the IPS/RGSS: (1) Better isolation of the system from shock and vibration, (2) Redesign the calibration procedure for the system, (3) Attempt to compensate for the effects of heading sensitivity, (4) Allow input into the system for the change in Azimuth caused by deflection of the vertical at the initial station, and (5) Change the smoothing program after the first four items are accomplished.

N81-10508/2 PC **A03**/MF **A01**
Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.
A Study on the Determination of the Kootwijk-Wettzell Baseline from Satellite Laser Ranging at These Stations.
K. F. Wakker, and B. A. C. Ambrosius. Jan 80, 28p VTH-LR-295
Presented at 2ND Meeting of the Lageos Working Group, Greenbelt, MD., Feb. 1980.

Results are presented of a preliminary study to determine the Kootwijk-Wettzell baseline and the Wettzell coordinates from satellite laser ranging. Five different estimates were obtained, based on three single arc, one two arc and one four arc solutions. The arcs were formed from 32 passes of four satellites over only the Kootwijk and Wettzell ranging stations during the period July 11 to August 24, 1978. Special attention was paid to the effects of the orbit station geometry, the number of passes, and the distribution of the passes over a time span.

N81-10509/0 PC **A02**/MF **A01**
Deutsches Geodaetisches Forschungsinstitut, Munich (Germany, F.R.).
Precise Modeling Aspects of Lunar Measurements and Their Use for the Improvement of Geodetic Parameters.
A. Stolz. 1979, 23p SER-A-90, ISBN-3-7696-8173-8
Sponsored by Alexander von Humboldt Siftung.

A description of the modeling of the lunar laser two way time delay is presented. The formulas employed for diurnal polar motion, short period tidal variations in universal time (UT), the effects of the Earth's nonrigidity on the nutation series, horizontal and vertical components of Earth-tidal deformation, retardation of the photon by the atmosphere, and relativistic effects on the measurement of time and the path of the photon are given. The use of the data for improving telescope coordinates, polar motion, and UT is described. Also discussed are the correlations which exist between ephemeris errors and errors in UT and polar motion, and between errors in UT and the y coordinate of the pole.

PB81-127995 PC **A02**/MF **A01**
National Geodetic Survey, Rockville, MD.
Motorized Leveling at the National Geodetic Survey.
Technical memo.,
Heinz Poetzschke. Oct 80, 25p NOAA-TM-NOS-NGS-26, NOAA-80101701

Since the early 1900's, various forms of motorized leveling modes have been attempted to speed up leveling operations. Because leveling has to be performed in the highly turbulent and fast changing layers of air near the ground, faster progress in leveling is a desirable goal. This will help to minimize the effects of refraction. Also, in motorized leveling heavier equipment can be used than in conventional leveling and, therefore, greater stability is induced in the setup of instrument and rods. A short review of the existing systems of motorized leveling is given, and the operation system of the National Geodetic Survey is described. The results show the improvements achieved with the NGS system.

8F. Geography

AD-A090 816/0 PC **A02**/MF **A01**
Bureau of Intelligence and Research (State) Washington DC
International Boundary Study. Series A. Limits in the Seas. Number 14, Straight Baselines: Burma.
14 Mar 70, 10p
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

The following declaration by the Chairman of the Revolutionary Council of the Union of Burma is published for general information: WHEREAS International Law has always recognised that the sovereignty of a State extends to a belt of sea adjacent to its coast, AND WHEREAS international practice is not uniform as regards the extent of this sea belt commonly known as the territorial sea of the State, and consequently it is necessary to make a declaration as to the extent of the territorial sea of the Union of Burma, the Chairman of the Revolutionary Council of the Union of Burma hereby declares-- That notwithstanding any rule of law or practice to the contrary which may have been observed in the past relating to the Union of Burma or any part thereof, the territorial sea of the Union of Burma shall extend into the sea to a distance of twelve nautical miles measured from the appropriate base line. Except as provided for in paragraph 3, the low-water line along the coast, as marked on large-scale charts officially recognised by the Government of the Union of Burma, shall be the base line for measuring the breadth of the territorial sea of the Union of Burma. That where it is necessary by reason of the geographical conditions prevailing on the Union of Burma coasts, and for the purpose of safeguarding the vital economic interest of the inhabitants of the coastal regions, to establish the system of straight base lines drawn between fixed points on the mainland, on islands or rocks, the breadth of the territorial sea shall be measured from such base lines. The fixed points between which such straight base lines shall be drawn are indicated in detail in the schedule annexed to this declaration.

AD-A090 817/8 PC **A07**/MF **A01**
Bureau of Intelligence and Research (State) Washington DC
International Boundary Study. Series A. Limits in the Seas. Number 36, National Claims to Maritime Jurisdictions.
3 Jan 72, 144p

The following list of national claims to maritime jurisdictions has been compiled and collated from the latest available official sources. The document is intended to be a research and reference tool and it does not necessarily constitute an official acceptance or recognition by the United States Government of the claims or of the specific principles or practices involved therein. While every effort has been made to insure the accuracy and reliability of the list, there may be mistakes and the user is requested to note any errors of omission or commission. Corrections should be forwarded to the Office of the Geographer, Department of State, Washington, D.C. 20520. As a cautionary note, the sections concerned with (a) bilateral and multilateral fishing agreements, and (b) maritime pollution legislation and agreements are considered to be of a lower degree of accuracy and completeness than the other portions of the study. As new data become available, correction sheets for the individual countries will be issued. Original recipients of the National Claims to Maritime Jurisdictions should receive these change sheets automatically. Inquiries on their status may be made to the address listed in the paragraph above. (Author)

AD-A090 818/6 PC **A02**/MF **A01**
Bureau of Intelligence and Research (State) Washington DC
International Boundary Study. Series A. Limits in the Seas. Number 42, Straight Baselines: Ecuador.
23 May 72, 14p
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

Ecuadorean straight baselines were proclaimed most recently by Supreme Decree No. 959-A on June 28, 1971 (Official Register No. 265 of July 13, 1971). The Decree established straight baselines adjacent to the mainland and around the Galapagos Islands (Archipelago de Colon). However, the existence of straight baselines around the Galapagos Islands has been inferred since 1950. Neither the inferred 1950 nor the 1971 straight baselines have been published on official Ecuadorean charts. Ecuador claims a 200-nautical-mile territorial sea measured seaward from the straight baselines. The 200-nautical-mile claim was promulgated by Decree 1542 of November 10, 1966. Waters within the baselines of both the mainland and the Galapagos Islands are considered to be internal waters. Ecuador is not a party to the four 1958 Geneva conventions on the law of the sea. These conventions concern (1) the territorial sea and contiguous zone, (2) the high seas, (3) the continental shelf, and (4) fishing and conservation of living resources of the high seas. (Author)

AD-A090 819/4 PC **A02**/MF **A01**
Bureau of Intelligence and Research (State) Washington DC
International Boundary Study. Series A. Limits in the Seas. Number 44, Straight Baselines: Argentina.
10 Aug 72, 6p
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

The Government of Argentina, by declaration and legislation, has created a system of straight baselines. The system, however, appears to relate more to claims based on the historic bay theory than to the articles of the Geneva Convention on the territorial sea, which apply to straight baselines. The system enclosed the estuary of the Rio de la Plata, which is shared geographically with Uruguay, and the gulfs of San Matias, Nuevo, and San Jorge. The Rio de la Plata estuary was included in the United Nations document (A/CONF.13/1) 'Memorandum Concerning Historic Bays' prepared for the 1958 Geneva Conference on the law of the sea. The bases for the claims to historicity for the remaining bays are not known. (Author)

AD-A090 820/2 PC **A02**/MF **A01**
Bureau of Intelligence and Research (State) Washington DC
International Boundary Study. Series A. Limits in the Seas. Number 45, Maritime Boundary: Mexico - United States.
11 Aug 72, 8p

On November 23, 1970, the Governments of Mexico and the United States signed a treaty for the clarification of the Rio Grande boundary and the creation of maritime boundaries between the claimed 12-nautical-mile Mexican territorial sea and the territorial sea and contiguous zone of the United States. The treaty delimits, in principle, the lines of separation in the Gulf of Mexico and in the Pacific Ocean. The two governments then established the final lines which were represented, at reduced scales, on two maps affixed to the treaty. (Author)

8G. Geology and Mineralogy

AD-A091 066/1 PC **A03**/MF **A01**
Foreign Technology Div., Wright-Patterson AFB, OH.
Some Features of Deep Structure and Origin of Lomonosov Ridge According to Aeromagnetic Data,
A. M. Karasik, N. I. Gurevich, V. N. Masolov, and V. G. Shchelovanov. 22 Aug 80, 36p Rept no. FTD-ID(RS)T-0799-80

Unedited machine trans. of Geofizicheskiye Metody Razvedki v Arktike (USSR) p9-19, 1971.

No abstract available.

AD-A091 356/6 PC **A02**/MF **A01**
Lamont-Doherty Geological Observatory, Palisades, NY.
Anlaysis of the Abundance Variations of the Subspecies of Cycladophora davisiana,
Joseph J. Morley. 14 Sep 79, 11p Rept no. LDGO-2958
Contract N00014-75-C0210, Grant NSF-OCE77-24975
Pub. in Marine Micropaleontology, v5 p205-214 1980.

No abstract available.

AD-A091 357/4 PC **A02**/MF **A01**
Lamont-Doherty Geological Observatory, Palisades, NY.
Petrology of Mantle-Derived Ultramafics from the Owen Fracture Zone, Northwest Indian Ocean: Implications for the Nature of the Oceanic Upper Mantle,
Paul R. Hamlyn, and Enrico Bonatti. 4 Sep 79, 17p Rept no. LDGO-2956
Contract N00014-75-C-0210, Grant NSF-OCE78-19453
Pub. in Earth and Planetary Science Letters, v48 p65-79 1980.

No abstract available.

FE-2346-63 PC **A02**/MF **A01**
Dow Chemical Co., Midland, MI.
Outcrop Descriptions of the Antrim Shale.
C. Hathon, D. Sibley, and F. W. Cambray. Apr 80, 13p DOW/SR-63
Contract AC01-76ET12153

Samples of Michigan Basin Antrim shale were taken from each of the three locations where the shale is exposed at the surface in sufficient quantity to be studied. Detailed stratigraphic descriptions were prepared. Although there is considerable variation between individual beds, there are no unique units which can be used for lithological correlation. (ERA citation 05:035991)

FE-2346-85 PC **A07**/MF **A01**
Michigan Technological Univ., Houghton. Inst. of Mineral Research.
Physical Properties of Michigan Antrim Shale.
W. A. Hockings. Aug 80, 139p
Contract AC01-76ET12153

The physical properties of approximately 225 core samples and 700 samples of well cuttings from the Antrim Shale formation in the Michigan Basin were measured. The properties included density, porosity, permeability, pore size distribution, specific surface, and thermal expansion. Measurements were made before and after roasting in air and in nitrogen. In general the properties showed little variation with depth or location within the sampling area. The average porosity was about 8 percent of which approximately one-half consisted of closed pores. The porosity increased by about a factor of two after roasting at 500 exp 0 C. The permeability was found to be very low, averaging about 0.008 millidarcies. Permeability was higher in the direction parallel to the bedding planes than in the direction perpendicular to the planes. After roasting at 500 exp 0 C the permeability increased by about a factor of ten. Measurements while heating from 20 to 225 exp 0 C showed only minor variations in permeability with temperature. The specific surface area of the shale is low, averaging about 0.5 square meters per gram. The pore size distribution is bimodal with most of the pore volume in the size ranges of 0.01 to 0.1 and 10 to 100 micrometers. The shale expands about one percent perpendicular to bedding and 0.2 percent parallel to bedding when heated to 500 exp 0 C. The average expansion coefficient is 0.0025 percent per exp 0 C on heating and 0.0010 on cooling. Peaks in the heating curve occur at about 25 exp 0 C and 450 exp 0 C. (ERA citation 05:036005)

GJBX-158(80) PC **A05**/MF **A01**
Bendix Field Engineering Corp., Grand Junction, CO.
Uranium/Thorium Determinations on Samples Collected from Seven Quadrangles in Eastern Alaska.
A. K. Tysdal. Aug 80, 91p
Contract AC13-76GJ01664

Uranium and thorium determinations for 1,314 rock and sediment samples collected from seven quadrangles located in eastern Alaska are presented. Uranium was detected by fluorometry on 1049 samples and by delayed neutron counting on 265 samples; thorium was detected by spectrophotometry and by x-ray fluorescence, respectively. (ERA citation 05:036972)

GJBX-169(80) PC **A09**/MF **A01**
Kansas Univ., Lawrence. Dept. of Geography.
Uranium Potential of Southwestern New Mexico (Southern Hidalgo County), Including Observations on Crystallization History of Lavas and Ash Tuffs and the Release of Uranium from Them. Final Report.
A. W. Walton, T. L. Salter, and D. Zetterlund. Aug 80, 184p
Contract AC13-76GJ01664

Geological environments present in southwestern New Mexico include thick sequences of sedimentary rock including limestone, conglomerates, sandstone, and shale: igneous intrusions with associated metal deposits; caldera centers, margins, and outflow facies; and basins with marginal faults and thick late Cenozoic sedimentary fillings. Predominant rock types are Paleozoic carbonates, Mesozoic terrigeneous rocks and carbonates, and Cenozoic volcanic rocks and basin-filling terrigeneous rocks. Consideration of information available in Preliminary Reconnaissance Reports and in Hydrogeochemical and Stream Reconnaissance Reports together with 347 new whole rock chemical analyses points to three areas of anomalous uranium abundance in Hidalgo County, New Mexico. The area has experienced three major periods of igneous activity in Phanerozoic time: one associated with the Laramide cycle of the Late Cretaceous and early Tertiary, mid-Tertiary cycle of silicic volcanism with abundant calderas, and a late Tertiary cycle of mafic volcanism. Silicic volcanic rocks are the most common exposed rock type in the area, and the most enriched in uranium (range, 0.4 to 19 ppM). The most likely source for any uranium ore-forming solutions lies with this cycle of volcanism. Solutions might have been introduced during volcanism or formed later by groundwater leaching of cooled volcanic rocks. Results indicate that groundwater leaching of cooled volcanic rocks was not an effective means of mobilizing uranium in the area. Study of several rhyolite lava flows indicates that they were emplaced in supercooled condition and may have crystallized completely at temperatures well below their liquids, or they may have warmed as crystallization released latent heat. Statistical comparison of the uranium concentration revealed no differences between vitrophyres and associated felsites. (ERA citation 05:035658)

INIS-mf-5603 PC **A10**/MF **A01**
Innsbruck Univ. (Austria).
Temperature Dependence of Uranium Fission Tracks and Thermal Age Determination in Apatite.
Theses Dr. phil,
E. Bertel. Mar 78, 207p
In German.
U.S. Sales Only.

The fission track length method for determining the age of mineral samples, after D.A. Young, Maerk and McDowell, is described. The samples used were mainly ores from Durango (Mexico) and a method of visualising fission tracks by optical microscopy is described based on etching after neutron irradiation. Differences between age determinations by various methods are analysed. The expression used for fission track age determination is due to Price and Walker. (Atomindex citation 11:517115)

LA-8479-PR PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Oklo: Natural Fission Reactor Program. Progress Report, January 1-March 31, 1980.
A. E. Norris. Aug 80, 15p ONWI/Sub-80/E511-01100-5
Contracts W-7405-ENG-36, AC06-76RL0183

The techniques to measure lead isotopic abundances in geologic material have been refined and tested with National Bureau of Standards lead isotope standards. The results from 28 analyses show that our measurements of exp 207 Pb/ exp 206 Pb and exp 208 Pb/ exp 206 Pb ratios are both reproducible and accurate. However, our data for the exp 204 Pb/ exp 206 Pb ratio indicate that our mass 204 background correction may be causing problems. The initial work to measure gadolinium isotopic abundances has been accomplished. Studies of rubidium and strontium isotopic ratios in the Oklo reactor zone 2 and adjacent areas indicate that fissiogenic rubidium and strontium are observed in solution when the samples adjacent to the reactor zone are leached for 20 minutes with 0.5 N HCl, while fissiogenic rubidium and strontium are observed in the insoluble residues of samples from reactor zone 2 that are leached in the same manner. Additional work will be done to see if some quantitative conclusions about rubidium and strontium transport at the Oklo site can be deduced. (ERA citation 05:036015)

LBL-11384 PC **A07**/MF **A01**
California Univ., Berkeley. Coll. of Engineering.
Model for Predicting Thermal Conductivity of Rock-Fluid Systems.
A. Ghaffari. Aug 80, 143p
Contract W-7405-ENG-48
Thesis.

An analytical study is presented for determining the effective thermal conductivity of partially liquid saturated porous media. A model made up of normal cubic-packed spheres, flattened at their contacts is utilized. The relative size of the contacts is determined from the two easily measurable properties of porosity and electrical formation resistivity factor. A reasonable fluid distribution in the model is incorporated by choosing the wetting phase to be a spherical layer of uniform thickness on the solid grain surfaces. Neglecting the contribution of any convection of the fluids in the pore channels and heat transfer by radiation, the heat conduction equation was solved for a unit cell of the model. The final results are presented in the form of working graphs using the dimensionless groupings of effective thermal conductivity divided by fluid or solid conductivity, solid conductivity divided by fluid conductivity, porosity, saturation of the wetting phase and dimensionless radius of top-bottom contacts. There is good agreement between values of the effective thermal conductivities of partially liquid saturated consolidated sandstones and unconsolidated sands calculated by the model and existing experimental data. (ERA citation 05:037366)

N81-10472/1 PC **A22**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Radar Geology: An Assessment Report of the Radar Geology Workshop.
1 Sep 80, 515p NASA-CR-163638, JPL-PUB-80-61
Contract NAS7-100
Workshop Held in Snowmass, Colo., 16-20 Jul. 1979. Original Contains Color Illustrations.

No abstract available.

PB81-115974 PC **A06**/MF **A01**
World Data Center A for Solid Earth Geophysics, Boulder, CO.
Geodynamics International - 16.
May 80, 121p SE-23, NOAA-80092206
Prepared in cooperation with Inter-Union Commission on Geodynamics, Vancouver (British Columbia). Office of the Secretariat. See also report dated Aug 79, PB80-111099.

In addition to reports on commission activities, working groups and national committees, this issue contains summaries of Scientific Symposia: 'Messinian Correlation: Salinity Crisis', held Rome, Italy, October 9-11, 1978; 'Hawaii Symposium on Intraplate and Submarine Volcanism', held Hilo, Hawaii, July 16-22, 1979; 'International Symposium on Rift Zones of the Earth: The Dead Sea Rift', held Jerusalem, Israel, September 10-20, 1979; 'Global Reconstructions and the Geomagnetic Field During the Paleozoic', held Canberra, Australia, December 2-15, 1979; and 'Dynamics of

Plate Interiors', held Canberra, Australia, December 5, 1979.

RHO-BWI-C-73 PC **A08**/MF **A01**
Shannon and Wilson, Inc., Portland, OR.
Compilation of a Reconnaissance Surface Geologic MAP of Oregon Underlain by Columbia River Basalt.
S. M. Farooqui. Mar 80, 160p
Contract AC06-77RL01030

A preliminary reconnaissance surficial geologic map of the late Cenozoic sediments and volcanic rocks overlying the Columbia River Basalt Group in the Dalles, Pendleton, Grangeville, Baker, Canyon City, and Bend, Oregon quadrangles was compiled. The compilations are based on previous work. No field checks were made. (ERA citation 05:037252)

SAND-80-0392 PC **A03**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Creep Healing of Fractures in Rock Salt.
L. S. Costin, and W. R. Wawersik. Aug 80, 30p
Contract AC04-76DP00789

Fracture and healing experiments were performed on specimens of bedded salt from the Salado formation, southeastern New Mexico. Short rod specimens (100 mm in diameter) were loaded to failure in tension. During each test, a crack was initiated along the axis of the specimen. The fracture toughness of the salt was determined from the resulting load-crack opening displacement record. After the test, each specimen was pieced back together, jacketed and placed in a pressure vessel under hydrostatic pressure for several days. The confining pressure (10 to 35 MPa), temperature (22 to 100 exp 0 C) and healing time (4 to 8 days) were varied to determine the effect of each on the healing process. Upon removal from the pressure vessel, each sample was retested and the toughness of the healed fracture was determined. Results show that the salt specimens regained 70 to 80% of their original strength under all conditions except at the lowest temperature and pressure where specimens regained only 20 to 30% of their original strength. It is suspected that the primary mechanism involved is creep of asperities along the fracture surface which forms an interlocking network. Thus, the healing pressure is probably the most significant variable. (ERA citation 05:035664)

8H. Hydrology and Limnology

AD-A091 159/4 PC **A02**/MF **A01**
Louisiana State Univ., Baton Rouge. Coastal Studies Inst.
Marine Sediment Instabilities in the Mississippi River Delta.
Technical rept.,
James M. Coleman, and David B. Prior. 1980, 17p
Contract N00014-75-C-0192
Pub. in Forefronts of Ocean Technology, pI-2/I-14 1979.

No abstract available.

BNL-51189 PC **A05**/MF **A01**
Brookhaven National Lab., Upton, NY.
Geological and Hydrochemical Sensitivity of the Eastern United States to Acid Precipitation.
G. R. Hendrey, J. N. Galloway, S. A. Norton, C. L. Schofield, and P. W. Shaffer. Mar 80, 100p
Contract AC02-76CH00016

A new analysis of bedrock geology maps of the eastern US constitutes a simple model for predicting areas which might be impacted by acid precipitation and it allows much greater resolution for detecting sensitivity than has previously been available for the region. Map accuracy has been verified by examining current alkalinities and pH's of waters in several test states, including Maine, New Hampshire, New York, Virginia and North Carolina. In regions predicted to be highly sensitive, alkalinities in upstream sites were generally low. Many areas of the eastern US are pinpointed in which some of the surface waters, especially upstream reaches, may be sensitive to acidification. Pre-1970 data were compared to post-1975 data, revealing marked declines in both alkalinity and pH of sensitive waters of two states tested, North Carolina, where pH and alkalinity have decreased in 80% of 38 streams and New Hampshire, where pH in 90% of 49 streams and lakes has decreased since 1949. These sites are predicted to be sensitive by the geological map on the basis of their earlier alkalinity values. The map is to be improved by the addition of a soils component. (ERA citation 05:037177)

PB81-118374 PC **A18**/MF **A01**
Environmental Research Lab.-Duluth, MN.
Proceedings of the American-Soviet Symposium on the Use of Mathematical Models to Optimize Water Quality Management (2nd) Held at Bloomfield Hills, Michigan on August 27-30, 1979,
Wayland R. Swain, and Virginia R. Shannon. Jul 80, 412p EPA-600/9-80-033

This report contains the proceedings of the papers presented at the Second US-USSR Symposium on the Use of Mathematical Models to Optimize Water Quality Management. Some of the subject areas covered are: Circulation or hydrodynamics of lakes, reservoirs and bays; sediment transport; and water chemistry of pollutants.

PB81-118390 PC **A09**/MF **A01**
Municipality of Metropolitan Seattle, WA.
Fate and Effects of Particulates Discharged by Combined Sewers and Storm Drains.
Final rept. Oct 77-Jul 79,
Richard D. Tomlinson, Brian N. Bebee, Andrew A. Heyward, Sydney G. Munger, and Robert G. Swartz. Aug 80, 185p EPA-600/2-80-111
Grant EPA-R-805602-01-0
Prepared in cooperation with Washington Univ., Seattle.

This report provides the details of an evaluation of the distribution and biological impacts of particulate materials in combined sewer and storm drain discharges in the Seattle, Washington region, and presents the extent of the urban runoff problem in terms of statistics and observed and anticipated impacts on water quality in Lake Washington and Puget Sound. The potential public health risk related to enteric viruses associated with such particulates is also addressed.

PB81-118622 PC **A06**/MF **A01**
Geological Survey, Menlo Park, CA. Water Resources Div.
Sediment Transport of Streams Tributary to San Francisco, San Pablo, and Suisun Bays, California, 1909-66.
Historical review 1909-66,
George Porterfield. Aug 80, 103p USGS/WRD/WRI-80/069, USGS/WRI-80-64
Prepared in cooperation with California Dept. of Water Resources.

A review of historical sedimentation data is presented, results of sediment-data collection for water years 1957-59 are summarized, and long-term sediment-discharge estimates from a preliminary report are updated. Comparison of results based on 3 years of data to those for the 10 water years, 1957-66, provides an indication of the adequacy of the data obtained during the short period to define the long-term relation between sediment transport and streamflow. During 1909-66, sediment was transported to the entire San Francisco Bay system at an average rate of 8.6 million cubic yards per year. The Sacramento and San Joaquin River basins provided about 83 percent of the sediment inflow to the system annually during 1957-66 and 86 percent during 1909-66. About 98 percent of this inflow was measured or estimated at sediment measuring sites. Measured sediment inflow directly to the bays comprised only about 40 percent of the total discharged by basins directly tributary to the bays.

PB81-118754 PC **A05**/MF **A01**
Gates (W. E.) and Associates, Inc., Batavia, OH.
Technology Assessment of Hydrology for Water Resource Management in Urbanizing Areas.
Sep 80, 79p W81-00192, OWRT-C-90226-T(9626)(1)

The historical development of rainfall-runoff models is discussed with emphasis placed on the evolution of the models and their responsiveness to the changing spatial requirements in rainfall-runoff and nonpoint source modeling. Primary emphasis in hydrologic analysis has been rainfall-runoff modeling; the prediction of how a watershed/catchment transforms rainfall into stream flow. Model development occurs through an iterative process involving phenomenological, statistical-empirical, and deterministic model forms. Rainfall-runoff modeling is currently in a stage in the iterative development process between two phenomenological models. All operational rainfall-runoff models are largely based on the outdated Horton model, while broadbased general acceptance has occurred for the spatially-based Hewlett model.

PB81-118788 PC **A04**/MF **A01**
Gates (W. E.) and Associates, Inc., Batavia, OH.
An Assessment of Nonpoint Source Technology for Water Resource Management in Urbanizing Areas.
Sep 80, 75p W81-00191, OWRT-C-90226-T(9626)(1)

Fourteen comprehensive models of the nonpoint source process were reviewed, and their space-time characteristics and component processes described. With only one exception, comprehensive model components were empirical or deterministic, with the current trend being the use of deterministic relationships. This exception, the ADAPT statistical NPS model, should have resulted in more operational models because of the large field data sets (urban and rural) collected over the past decade. Also, there appeared to be a trend towards greater incorporation of spatial characteristics in more recent models. Historically, nonpoint source research has been segregated into three areas: urban analysis, sediment modeling, and chemical modeling. The primary research requirement is to establish a common framework in which nonpoint source research and modeling may be placed. A proposed watershed reactor concept provides such a general framework.

PB81-119091 PC **A04**/MF **A01**
Clemson Univ., SC. Water Resources Research Inst.
Prediction of Baseflow for Piedmont Watersheds.
Rept. for Jan 75-Dec 77,
T. V. Wilson, and J. T. Ligon. Nov 79, 56p WRRI-80, W81-00197, OWRT-A-034-SC(1)

Ability to accurately predict baseflow rates under adverse weather conditions would be beneficial in systems planning for water supplies, pollution dispersion and removal, and recreational facilities. Four Piedmont watersheds and one Sandhill watershed, all unregulated flow, were selected for this study, which used a previously-developed baseflow model to estimate daily baseflow regimes for Piedmont watersheds. Two factors that appeared to give most trouble were (1) the lack of representative watershed precipitation data, and (2) the inability to use simple relationships to estimate surface runoff (which was not part of baseflow). The watersheds were divided into upper and lower zones based on the approximate depth to the water table. Using the nearest available precipitation data, estimated daily evaportranspiration rates, estimated surface runoff, and root zone soil moisture storage capacity was given. A daily soil moisture balance was used to calculate excessive soil moisture (EXSM). The water is assumed to contribute to saturated water storage and ultimate baseflow. All baseflow was assumed to be derived from EXSM.

PB81-119802 PC **A16**/MF **A01**
Geological Survey, Trenton, NJ. Water Resources Div.
Water Resources Data for New Jersey, Water Year 1979. Volume 1: Atlantic Slope Basins, Hudson River to Cape May.
Water-data rept. (Annual) 1 Oct 78-30 Sep 79.

Jul 80, 357p USGS/WRD/HD-80-055, USGS/WDR-NJ-79-1
Prepared in cooperation with New Jersey Dept. of Environmental Protection, Trenton. See also report dated Jun 79, PB80-116528 and Volume 2, PB81-119810.

Water Resources data for the 1979 water year for New Jersey consist of records of stage, discharge, and water quality of streams; stage, contents, and water quality of lakes and reservoirs; and water levels and water quality of ground water. This volume of the report contains discharge records for 75 gaging stations; tide summaries for one station; stage and contents for 15 lakes and reservoirs; water quality for 111 surface water sites and 110 wells; and water levels for 35 observation wells. Also included are data for 44 crest-stage partial-record stations and 47 low-flow partial-record stations.

PB81-119810 PC **A11**/MF **A01**
Geological Survey, Trenton, NJ. Water Resources Div.
Water Resources Data for New Jersey, Water Year 1979. Volume 2: Delaware River Basin and Tributaries to Delaware Bay.
Water-data rept. (Annual) 1 Oct 78-30 Sep 79.
Jul 80, 242p USGS/WRD/HD-80-056, USGS/WDR-NJ-79-2
Prepared in cooperation with New Jersey Dept. of Environmental Protection, Trenton. See also Volume 1, PB81-119802.

Water resources data for the 1979 water year for New Jersey consist of records of stage, discharge, and water quality of streams; stage, contents, and water quality of lakes and reservoirs; and water levels and water quality of ground water. This volume of the report contains discharge records for 27 gaging stations; tide summaries for 3 stations; stage and contents for 16 lakes and reservoirs; water quality for 86 surface water sites and 65 wells; and water levels for 16 observation wells. Also included are data for 27 crest-stage partial-record stations and 25 low-flow partial-record stations.

PB81-120594 PC **A06**/MF **A01**
Connecticut Univ., Storrs.
Investigation of a Surface Resistivity Technique for the Estimation of Hydraulic Conductivity in Stratified Drift Aquifers.
Master's thesis,
David Scott. 1980, 110p W81-00267, OWRT-A-077-CONN(3)
Contract DI-14-34-0001-7014

A least squares regression line correlating hydraulic conductivity with apparent formation factor of aquifers in sand and gravel (generally thought to be stratified drift in the cases discussed) is presented. Nineteen aquifers in southern New England were studied. Schlumberger vertical electrical soundings (VES) were conducted at water well sites for which pump test data were available. Methods for the interpretation of pump test data from water table and leaky artesian aquifers are discussed. The ratio of vertical to horizontal hydraulic conductivity averaged one to twenty-seven in the aquifers studied.

PB81-120859 PC **A04**/MF **A01**
Geological Survey, Helena, MT. Water Resources Div.
Streamflow Characteristics of the Yellowstone River Basin, Montana, Through 1976.
Water-resources investigations (Final),
L. Grady Moore, and Ronald R. Shields. Jul 80, 75p USGS/WRD/WRI-80/070, USGS/WRI-80-41
Prepared in cooperation with Montana Dept. of Natural Resources and Conservation, Helena.

Statistical summaries of streamflow data for selected stream-gaging and crest-stage-gage sites are presented in this report to aid in appraising the hydrology of the Yellowstone River basin. Streamflow records are presented for 45 gaging stations and 45 crest-stage gages for the period of record. For each gaging station selected for this report, a brief description is given for station location, drainage area, period of record, revisions of previously published records, type and history of gages, regulation and diversions, and extremes of discharge. These data are followed by tables of monthly and annual flow statistics, high-flow and low-flow frequency data, flood-frequency data, flow-duration information, and for natural-flow sites selected basin characteristics.

PB81-120925 PC **A11**/MF **A01**
Geological Survey, Augusta, ME. Water Resources Div.
Water Resources Data for Maine, Water Year 1979.
Water-data rept. (Annual) 1 Oct 78-30 Sep 79.
Aug 80, 239p USGS/WRD/HD-80/066, USGS-WDR-ME-79-1
Prepared in cooperation with the State of Maine. See also report dated Sep 79, PB80-122310.

Water resources data for the 1979 water year for Maine consist of records of stage, discharge, and water quality of streams; stage and contents of lakes and reservoirs; and water levels and water quality of wells. This report contains discharge records for 69 gaging stations; stage only for 2 gaging stations; contents for 17 lakes and reservoirs; water quality for 13 gaging stations and 27 wells; and water levels for 21 observation wells.

PB81-120933 PC **A22**/MF **A01**
Geological Survey, Doraville, GA. Water Resources Div.
Water Resources Data for Georgia, Water Year 1979.
Water-data rept. (Annual) 1 Oct 78-30 Sep 79.
Jul 80, 516p USGS/WRD/HD-80/059, USGS-WDR-GA-79-1
Prepared in cooperation with the State of Georgia. See also report dated Sep 79, PB80-114622.

Water resources data for the 1979 water year for Georgia consists of records of stage, discharge, and water quality of streams; stage and contents of lakes and reservoirs; and ground-water levels. This report contains discharge records for 100 gaging stations; stage for 10 gaging stations; stage and contents for 17 lakes and reservoirs; water quality for 25 continuous stations, 151 periodic stations and miscellaneous sites; peak stage and discharge only for 98 crest-stage partial-record stations and 12 miscellaneous sites; measurements of discharge at 110 low-flow partial-record stations and 21 miscellaneous sites; and water levels of 28 observation wells.

PB81-121048 PC **A11**/MF **A01**
Stormwater Consultants, Bolingbrook, IL.
Stormwater Management in the United States. A Study of Institutional Problems, Solutions and Impacts,
Herbert G. Poertner. Sep 80, 250p W81-00263, OWRT-C-5239(4235)(1)
Contract DI-14-31-0001-4235

Personal interviews were conducted in many urban and metropolitan areas of the United States to investigate institutional problems in stormwater management. Successful solutions and the impacts and transferability of solutions were studied in detail. The objective was to prepare a report useful to local public officials and management personnel in developing and operating effective, economical and timely programs and facilities for managing stormwater. Extensive case studies were made of: Cook County, Illinois; Metropolitan Denver, Colorado; Fairfax County, Virginia; and the City and County of Tulsa, Oklahoma. The studies addressed the broad field of stormwater management, including both 'control' and 'developmental' activities.

PB81-124430 PC **A06**/MF **A01**
Mississippi State Univ., Mississippi State. Water Resources Research Inst.
Proceedings of Annual Mississippi Water Resources Conference (14th) Held at Jackson, Mississippi on 24-25 September 1979.
1979, 107p W81-00290, OWRT-A-999-MISS(15)
See also PB-226 766.

Twenty of the twenty-one papers presented at the conference are given covering the areas of resource development, runoff and erosion, floods and flood plains, and water quality. Five of the papers center around the Tennessee-Tombigbee Waterway now under construction to provide a navigable waterway connecting the Tennessee River and the Gulf of Mexico. Other topics include dam safety, environmental impact assessment, streambank erosion, sediment yields, river crossings, crop damage assessment, remote monitoring systems, and water quality enhancement techniques.

PB81-124760 PC **A05**/MF **A01**
Geological Survey, Lakewood, CO. Water Resources Div.
Calibration and Potential Uses of a Digital Water-Quality Model for the Arkansas River in Pueblo County, Colorado.
Water-resources investigations,
Kimball E. Goddard. May 80, 94p USGS/WRD/WRI-80/075, USGS/WRI-80-38
Prepared in cooperation with Pueblo Area Council of Governments, CO.

Based on the calibration, the model is capable of accurately predicting concentrations of carbonaceous biochemical oxygen demand, total organic nitrogen, total nitrite, and total orthophosphate; predicted concentrations of total ammonia, total nitrate, and dissolved oxygen will be somewhat less accurate. Additional data are needed to determine the model's capability to predict concentration of coliform bacteria. Potential uses of the model were demonstrated by simulating the effects of different wastewater discharges on streamflow quality, using water-quality and stream-discharge data provided by the Pueblo Area Council of Governments.

PB81-124992 PC **A22**/MF **A01**
Geological Survey, Lakewood, CO. Water Resources Div.
Water Resources Data for Colorado, Water Year 1979. Volume 1. Missouri River Basin, Arkansas River Basin, and Rio Grande Basin.
Water-data rept. (Annual) 1 Oct 78-30 Sep 79.
Aug 80, 516p USGS/WRD/HD-80-047, USGS-WDR-CO-79-1
Prepared in cooperation with the State of Colorado. See also report dated Aug 79, PB80-119944.

Water-resources data for Colorado for the 1979 water year consists of records of stage, discharge, and water quality of streams; stage, contents, and water quality of lakes and reservoirs, and water levels and water quality of wells and springs. This report contains discharge records for about 460 gaging stations, stage and contents of 22 lakes and reservoirs, 4 partial-record low-flow stations, 93 crest-stage partial-record stations, and 200 miscellaneous sites; water quality for 143 gaging stations and 130 miscellaneous sites; and water levels for 55 observation wells.

8I. Mining Engineering

CONF-8006103-1 PC **A02**/MF **A01**
Texas Univ. at Austin. Bureau of Economic Geology.
Methane Entrained in Geopressured Aquifers, Texas Gulf Coast.
R. A. Morton. Jul 80, 23p
Contract AC08-78ET11397
IIASA conference on world gas resources, Laxenburg, Austria, 30 Jun 1980.

Six tests of geopressured aquifers have yielded between 3.6 to 4.5 m exp 3 /m exp 3 (20 to 25 scf/bbl) of gas. These low gas concentrations are attributed to high salinities, that in all tests exceeded 100,000 mg/l, but undersaturated conditions cannot be ruled out completely. Research efforts are designed to delineate the geographic and stratigraphic variations in salinity and to recognize regional and local trends so that zones of lower salinity and higher gas concentration can be identified. Moreover, well logs and seismic data are being used to develop methods of detecting low concentrations of free gas in watered-out gas sands and in thin sands that were considered as noncommercial prior to renewed interest in unconventional gas supplies. (ERA citation 05:036555)

COO-4635-1 PC **A10**/MF **A01**
Colorado School of Mines, Golden.

Geothermal Loan Guaranty Program and Its Impact on Geothermal Exploration and Development.
L. H. Nasr. May 78, 217p
Contract AC02-78ET27214

The study showed that the Geothermal Loan Guaranty Program has had only a negligible effect on geothermal development and the response to the program was far less than expected. The streamlining of environmental regulations and leasing policies, and the granting of intangible drilling cost write-offs and depletion allowances to operators would have had a greater impact on geothermal energy development. The loan guaranty program did not promote the undertaking of any new projects that would not have been undertaken without it. The program only accelerated the pace for some development which might have commenced in the future. Included in the study are recommendations for improving the operation of the program thereby increasing its attractiveness to potential applicants. (ERA citation 05:034799)

DOE/BC/10068-16 PC **A06**/MF **A01**
Northwestern Univ., Evanston, IL.
Interfacial Effects in the Recovery of Residual Oil by Displacement: Studies at Northwestern University. Annual Report, March 1979-February 1980.
J. C. Slattery. Oct 80, 110p
Contract AC19-79BC10068

The primary goal of this work is to determine the relative effects of the interfacial viscosities, of interfacial tension, of advancing contact angle, and of receding contact angle upon the relative permeability and capillary pressure functions. The optimal design of a tertiary recovery flooding process depends upon the ability to anticipate how changes in the interfacial viscosities, interfacial tension, and the wetting characteristics of the porous medium will affect the relative permeability and capillary pressure functions. Analysis of displacement in a cylindrical pore is completed. A study is underway on displacement through an irregular pore, the diameter of which is a sinusoidal function of axial position. As a bubble or drop is forced towards a phase interface, a thin film forms, drains, becomes unstable, and coalescence occurs. Two papers have been finished that discuss the drainage of thin liquid films. It appears that the surface viscosities may play a minimal role in the drainage process. No judgment is possible from these analyses about the effect of the interfacial viscosities upon the stability of a film or, ultimately, upon coalescence. A structural model for a porous medium is developed in the form of a randomized, three-dimensional network that can be employed to correlate for a given system the single-phase permeability, the drainage and imbition capillary pressure curves, and the two drainage relative permeability curves as measured during steady-state flows. The subsequent portions of the hysteresis loops for capillary pressure and for the relative permeabilities then can be predicted. Torsional (the knife-edge, disk, and thin biconical bob) surface viscometers have been redesigned in a simpler and more sensitive configuration. (ERA citation 05:035955)

DOE/BETC/RI-80/4(Rev.) PC **A02**/MF **A01**
Department of Energy, Bartlesville, OK. Bartlesville Energy Technology Center.
Technical Constraints Limiting Application of Enhanced Oil Recovery Techniques to Petroleum Production in the United States.
Sep 80, 25p

A cost-shared program was initiated in 1974 to accelerate the application of advanced EOR processes. An incentive program was also announced in 1979 for the commercialization of EOR techniques. This report provides a summary of the EOR state-of-the-art and draws upon the data base developed thus far. A critical review of four major cost-shared chemical projects is included. Chemical recovery, miscible recovery, and thermal recovery techniques are covered. The FY 1979 DOE EOR program is summarized in a table. (ERA citation 05:035957)

DOE/BETC-80/2 PC **A07**/MF **A01**
Department of Energy, Bartlesville, OK. Bartlesville Energy Technology Center.
Contracts for Field Projects and Supporting Research on Enhanced Oil Recovery and Improved Drilling Technology. Progress Review No. 22, Quarter Ending March 31, 1980.
B. Linville. Jul 80, 150p

This report contains statements of objectives and summaries of technical progress on all DOE contracts pertaining to enhanced oil recovery and improved drilling techniques. Subject categories include chemical flooding; carbon dioxide injection; thermal recovery of heavy oil; resource assessment; improved drilling technology; residual oil; environmental; petroleum technology; and microbial enhanced oil recovery. An index containing the names of the companies and institutions involved is included. Current publications resulting from the DOE contractual program are listed. (ERA citation 05:035956)

DOE/EIA-0126(77) PC **A02**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
Energy Data Report: Distribution of Pennsylvania Anthracite for the Calendar Year 1977.
Apr 79, 11p

This report of the Department of Energy presents detailed and summarized data on the distribution of Pennsylvania anthracite in 1977, by size of output from preparation plants and method of transportation. Shipments of Pennsylvania anthracite totaled 5,801,603 short tons in calendar year 1977, a decline of approximately 5% from the amount shipped in 1976. Shipments to markets within the United States totaled 4,743,259 tons or almost 82% of total shipments. Exports to the Canadian market totaled 525,638 short tons in 1977, an increase of 18% over the 445,397 tons exported in 1976. The carrier method of anthracite shipments was approximately 63% by truck and 37% by rail. (ERA citation 05:034509)

DOE/ET/14211-T1 PC **A11**/MF **A01**
Dames and Moore, Park Ridge, IL.
Study of the Properties of Mine Waste in the Midwestern Coal Fields. Phase I Report.
4 Jul 80, 237p
Contract AC01-79ET14211

In an effort to assist the coal industry in complying with the applicable regulations, to design safe and environmentally acceptable disposal systems, and to encourage secondary use of coal mine waste, the US Department of Energy has initiated research programs to develop coal mine waste disposal and use technology. This study of the properties of mine wastes in the Midwestern coal fields has been limited to the waste materials obtained from underground coal mines and preparation plants attached to both underground and surface mines. The program has been divided into two phases. In Phase I, the 20 most important properties relevant to safe disposal, reclamation, underground disposal, and secondary uses have been identified. An inventory of the significant waste disposal sites in the Midwestern coal fields has been prepared. The site locations have been plotted on USGS maps. Estimates of coal production and coal mine waste production during the next 2 decades have been prepared and are presented in this report. Also, all available information obtained from a search of existing literature on physical and chemical properties, including analysis results of the general runoff from the refuse disposal areas, has been collected and is presented. In order to fill the gaps in information, 20 sites have been identified for drilling and sampling to determine the various physical and chemical properties. They have been selected on the basis of the distribution and quantity of waste at the existing locations (both abandoned and active), the future trends in production and likely locations of waste disposal areas, their geographical and geological distribution, and ease of accessibility for drilling and sampling. (ERA citation 05:035909)

DOE/ET/14270-T1 PC **A03**/MF **A01**
Foster-Miller Associates, Inc., Waltham, MA.
Feasibility of a Continuous Surface Mining Machine Using Impact Breakers. First Quarterly Report, October 1-December 31, 1979.
A. T. Fisk. Jan 80, 37p
Contract AC01-79ET14270

This is the first quarterly report on the efforts to evaluate the feasibility of excavating coal and overburden from surface mines using impact breakers. The initial stages of the project are devoted to a literature search, equipment selection, test site selection, and conceptual test system design. Hence, this report details the progress made in these areas; the next quarter will see the finalization of Phase I. Included as appendices to this report are FMA internal reports on the individual mines visited. These reports are the basis of the test site selection, and have been censored here to remove data the mine operators deemed as confidential. (ERA citation 05:035913)

DOE/ET/14270-T2 PC **A05**/MF **A01**
Foster-Miller Associates, Inc., Waltham, MA.
Feasibility of a Continuous Surface Mining Machine Using Impact Breakers. Phase I Report, 1 October 1979-31 March 1980.
A. T. Fisk, and R. J. Simpson. Apr 80, 84p
Contract AC01-79ET14270

This is the first phase report of the efforts to evaluate the feasibility of excavating coal and overburden from surface mines using impact breakers. Phase I is divided into four task groups. Those tasks are as follows: Selection of Field Sites for Parametric, Selection of Impact Hammers for Field, Design Test System, and Prepare Parametric Test Plan. A detailed description and accounting of each task is given in the body of this report. Included as appendices are the FMA internal reports on the individual mines visited. These reports are the basis of test site selection. The basic finding of this phase are that industry interest in the concept of impact mining tends toward the removal of multiple thin seams of coal and parting rather than deep coal or overburden and, while the intent of this contract is to explore the feasibility of impactors in a vertical array for use in a terraced mine plan, future design of a continuous mining machine should take industry acceptance into account. (ERA citation 05:035914)

DOE/ET/27032-1 PC **A03**/MF **A01**
Alvin Community Coll., TX.
Geothermal Energy Impact in Brazoria County. Final Report, 15 July 1978-November 30, 1979.
B. Horine. Jun 80, 43p
Contract AS08-78ET27032

All activities performed by Alvin Community College and the University of Texas at Austin in association with the development of Geopressured-Geothermal energy are contained in this report. A discussion of the progress of the Test Well is also contained herein. Public seminars and workshops were presented to the local community. A summer institute in energy was also presented to local public school teachers. A compaign to publicize the development of the new energy resource was also waged. An overall evaluation of the project is also attached. (ERA citation 05:036539)

DOE/ET/27041-1 PC **A06**/MF **A01**
Geothermal Power Corp., Novato, CA.
Kelly Hot Spring Geothermal Project: Kelly Hot Spring Agricultural Center Preliminary Design. Final Technical Report.
A. B. Longyear. Aug 80, 120p
Contract AC03-79ET27041

A Phase 1 Preliminary Design, Construction Planning and Economic Analysis has been conducted for the Kelly Hot Spring Agricultural Center in Modoc County, California. The core activity is a 1360 breeding sow, swine raising complex that utilizes direct heat energy from the Kelly Hot Spring geothermal resource. The swine is to be a totally confined operation for producing premium pork in controlled-environment facilities. The complex contains a feed mill, swine raising buildings and a complete waste management facility that produces methane gas to be delivered to a utility company for the production of electricity. The complex produces 6.7 million pounds of live pork (29,353 animals) shipped to slaughter per year; 105,000 cu. ft. of scrubbed methane per day; and fertilizer. Total effluent is less than 200 gpm of agricultural quality-water with full odor control. The methane production rate made possible with geothermal direct heat is equivalent to at least 400 kw continuous. Sale of the methane on a co-generation basis is being discussed with the utility company. The

use of geothermal direct heat energy in the complex displaces nearly 350,000 gallons of fuel oil per year. Generation of the biogas displaces an additional 300,000 gallons of fuel oil per year. (ERA citation 05:036571)

DOE/ET/28505-T2 PC **A03**/MF **A01**
MITRE Corp., McLean, VA. METREK Div.
Conceptual Design of a Geothermal Site Development Forecasting System.
E. A. Neham, and D. J. Entingh. Mar 80, 49p
MTR-80W72
Contract AC01-77ET28505

A site development forecasting system has been designed in response to the need to monitor and forecast the development of specific geothermal resource sites for electrical power generation and direct heat applications. The system is comprised of customized software, a site development status data base, and a set of complex geothermal project development schedules. The system would use site-specific development status information obtained from the Geothermal Progress Monitor and other data derived from economic and market penetration studies to produce reports on the rates of geothermal energy development, federal agency manpower requirements to ensure these developments, and capital expenditures and technical/laborer manpower required to achieve these developments. (ERA citation 05:034770)

DOE/MC/10689-3 PC **A07**/MF **A01**
New Mexico Petroleum Recovery Research Center, Socorro.
Mobility Control for CO sub 2 Floods: A Literature Survey.
Oct 80, 142p
Contract AC21-79MC10689

Of all the Enhanced Oil Recovery (EOR) processes, flooding by carbon dioxide offers the brightest promise, both of significant increases to the Nation's oil supply, and of availability in the near term. A way must be found to control severe frontal instabilities which seriously degrade the efficiency of the displacement of crude oil through the pore space of the reservoir rock by the less viscous CO sub 2 . Of currently operational EOR projects, CO sub 2 floods are second in number only to those heavy oil recovery projects which use steam. However because of frontal instability, CO sub 2 floods are liable to early CO sub 2 breakthrough, and to flooding inefficiency that will cause premature production decline. This Literature Survey is part of a laboratory research project which seeks practical methods of mobility control for CO sub 2 floods. The development of such methods should be very cost effective because the dissemination of information about them throughout the industry will persuade operators that enhance oil production from CO sub 2 floods can be sustained by increased displacement efficiency. 151 references. (ERA citation 05:035958)

DOE/PC/30013-1 PC **A04**/MF **A01**
Pennsylvania State Univ., University Park. Coal Research Section.
Data Base for the Analysis of Compositional Characteristics of Coal Seams and Macerals. Quarterly Technical Progress Report, February-April 1980.
A. Davis, N. H. Suhr, W. Spackman, P. C. Painter, and P. L. Walker. Jun 80, 55p
Contract AC22-80PC30013

The basic objective of this program is to invetigate systematic relationships between the properties of US coals and macerals. Thirty-five samples from the Lower Kittanning seam have been collected to study the vertical and lateral variability of petrographic, chemical, mineralogical and plastic characteristics within a single coal seam. The ratio of aromatic to aliphatic C-H groups as measured by the integrated absorption or peak areas shows a linear relationship with coal rank (reflectance). Uptake of CO sub 2 at 25 exp 0 C on -20 mesh sizes of selected coals (PSOC-1166, 1171, 1197, and 1201) has been measured. From Dubinin-Polanyi plots, micropore surface areas and micropore volumes were obtained. Displacement of mercury was used to estimate particle densities for -20 mesh and -100 mesh sizes of coals and vitrinite concentrates. Some uncertainty in this measurement is introduced because of the difficulty of knowing at what pressure filling of voids between particles with mercury is complete. A new helium density apparatus has been constructed which promises to speed up measurements. Two coals from China were found to have very unusual characteristics. The extremely high liptinite (cutinite) content of one would account for its anamolous chemical composition and liquefaction behavior. Several organic and inorganic components of liquefaction residues can be recognized under the microscope. The proportions of these components in residues from experiments performed by PETC appear to be related to process conditions. Major, minor element and mineralogical analyses are reported for up to 21 coals. (ERA citation 05:035901)

DOE/RA-0050 PC **A10**/MF **A01**
Department of Energy, Washington, DC. Office of Resource Applications.
Geothermal Energy Research Development and Demonstration Program.
Jun 80, 204p IGCC-5

The Federal program's goal, strategy, plans, and achievements are summarized. In addition, geothermal development by state and local governments and, where available, by the private sector is described. (ERA citation 05:036541)

DOE/RA-0051/4 PC **A06**/MF **A01**
MITRE Corp., McLean, VA.
Geothermal Progress Monitor. Progress Report No. 4.
Sep 80, 109p
Contract AC01-79ET27224

The following are included: geothermal power plants proposed and on-line; direct heat applications proposed and operational; trends in drilling activities; exploration; leases; outreach and technical assistance; feasibility studies and application demonstrations; geothermal loan guaranty program; research and development activities; legal, institutional, and regulatory activities; environmental activities; reports and publications; and a directory. (ERA citation 05:034764)

EPRI-CS-989(V.1) PC **A05**/MF **A01**
Science Applications, Inc., Palo Alto, CA.
Nuclear Assay of Coal. Volume 1. Coal Composition by Prompt Neutron Activation Analysis: Basic Experiments. Final Report.
G. Reynolds, H. Bozorgmanesh, E. Elias, T. Gozani, and T. Maung. Apr 80, 80p

Using californium-252 as a source of exciting neutrons, prompt gamma photons emitted by elemental nuclei in the coal have been measured using several detectors, including sodium-iodide and germanium-lithium. Several coal types, including bituminous, subbituminous lignite and anthracite were crushed to various top sizes and analyzed carefully by traditional ASTM wet chemistry techniques at two or three different laboratories. The elements (sulfur, hydrogen, carbon, aluminum, silicon, iron, calcium, sodium, nitrogen, and chlorine) were determined by prompt neutron activations and the quantities compared with those of the wet chemical analyses. (ERA citation 05:035902)

FE-2286-56 PC **A17**/MF **A01**
Institute of Gas Technology, Chicago, IL.
Preparation of a Coal Conversion Systems Technical Data Book. Project 61003 Quarterly Report, August 1-October 31, 1979.
Sep 80, 397p
Contract AC01-76ET10255

This quarterly report consists of a report on coal storage, handling, and preparation, prepared by Resource Engineering Corporation, Lexington, Massachusetts, for the Coal Conversion Systems Technical Data Book. The report was prepared in the Data Book format and is reproduced here with minor editorial corrections. (ERA citation 05:035929)

FE-2346-73 PC **A07**/MF **A01**
Dow Chemical Co., Midland, MI. Process Development Dept.
Energy from True in Situ Processing of Antrim Shale: Extraction Trials in an Explosively Fractured Site.
M. L. VanDerPloeg, C. A. Peil, C. G. Kinkel, R. K. Pihlaja, and D. A. Murdick. Aug 80, 135p
Contract AC01-76ET12153

Three in situ energy extraction trials were conducted at The Dow Chemical Company's oil shale site, in Michigan's Sanilac County, near the town of Peck. Here the Antrim shale layer occurs between 1200 and 1400 feet underground. The trials began on October 14, 1979, and ended on April 1, 1980. The three trials, lasting 7, 60 and 17 days respectively, were conducted in a formation prepared by explosive fracturing. Ignition energy was generated with a methane burner. Some energy in the form of a dilute fuel gas (5 to 50 btu/scf) was recovered in each trial but upon ignition drastic decreases in flow communication occurred between injection and production wells. That problem prevented the planned exploration of techniques which would raise the energy value of the production gas. Upon cool down of the formation after each trial, air permeability tests showed inter-well communication levels returning to near preburn levels. Thermal expansion is the most likely cause of the reduced permeability experienced under retorting conditions. (ERA citation 05:035994)

FE-2346-87 PC **A03**/MF **A01**
Dow Chemical Co., Midland, MI.
Development of an Induced Fracture Model for Antrim Shale.
S. Carmi. Aug 80, 41p
Contract AC01-76ET12153

The main goal of our investigation was to develop a structural response model which simulates the in-situ fracturing of Antrim oil shale for the purpose of enhancing permeability and thus allow partial combustion for the subsequent retorting and recovery of petroleum products. We strictly adhered to our goal and developed a model, which through a number of stages, is capable of predicting the change in rock permeability for a given explosive load and existing in-situ conditions such as rock material properties and overburden pressure. Our computer model uses as a first step a finite element package which we developed for calculating the induced stress field due to the explosion. This stage is followed by a rock-failure and crack analysis of the individual elements and joints which culminates in the final state which is the rock permeability assessment. Our results are presented as computer program listings, graphic representations of the finite element mesh and figures which graphically display our findings. The result relating to the differential permeability penetration, namely the preferred vertical rather than the horizontal direction, is noteworthy and of particular practical interest. (ERA citation 05:035997)

FE-2346-92 PC **A02**/MF **A01**
Environmental Research Inst. of Michigan, Ann Arbor.
Seismic Investigations of Antrim Shale Fracturing-Ground Motion Studies.
R. M. Turpening, and C. Frolich. Sep 80, 18p
Contract AC01-76ET12153

The Dow Chemical Company contract with the Department of Energy to investigate the feasiblity of recovering energy from Antrim shale by an in situ process required the investigation of several fracturing techniques. One of these included the use of explosives detonated in wellbores at a depth of 1200 to 1400 feet. This report summarizes the seismic monitoring of several of these explosions and the analysis of the data obtained. (ERA citation 05:035998)

GJBX-165(80) PC **A06**/MF **A01**
Oak Ridge National Lab., TN.
Methods for Obtaining Distributions of Uranium Occurrence from Estimates of Geologic Features.
C. E. Ford, and R. A. McLaren. Apr 80, 109p K/CSD-13
Contract AC13-76GJ01664

The problem addressed in this paper is the determination of a quantitative estimate of a resource from estimates of fundamental variables which describe the resource. Due to uncertainty about the estimates, these basic variables are stochastic. The evaluation of random equations involving these variables is the core of the analysis process. The basic variables are originally described in terms of a low and a high percentile (the 5th and

95th, for example) and a central value (the mode, mean or median). The variable thus described is then generally assumed to be represented by a three-parameter lognormal distribution. Expressions involving these variables are evaluated by computing the first four central moments of the random functions (which are usually products and sums of variables). Stochastic independence is discussed. From the final set of moments a Pearson distribution is obtained; the high values of skewness and kurtosis resulting from uranium data require obtaining Pearson curves beyond those described in published tables. A cubic spline solution to the Pearson differential equation accomplishes this task. A sample problem is used to illustrate the application of the process; sensitivity to the estimated values of the basic variables is discussed. Appendices contain details of the methods and descriptions of computer programs. (ERA citation 05:034584)

GJBX-170(80) PC **A13**/MF **A01**
Research Associates of Wyoming, Casper.
Uinta Arch Project: Investigations of Uranium Potential in Precambrian X and Older Metasedimentary Rocks in the Unita and Wasatch Ranges, Utah and Colorado.
P. J. Graff, J. W. Sears, and G. S. Holden. Jun 80, 297p
Contract AC13-76GJ01664

This study is part of the United States Department of Energy's National Uranium Resource Evaluation Program to understand the geologic setting, amount, and availability of uranium resources within the boundaries of the United States. The systematic study of Precambrian quartz-pebble conglomerates and areas that may contain such conglomerates is an integral part of DOE's resource evaluation program, because deposits of world-wide importance occur in such terrains in Canada and South Africa, and because terrains similar to those producing uranium from quartz-pebble conglomerates exist elsewhere in the United States. Because of the ready availability of Tertiary sandstone and Colorado Plateau-type uranium deposits, large areas of Precambrian rocks in the US have not been fully assessed for uranium potential. Thus, the Uinta Arch Project was undertaken to assess the favorability of Precambrian metasedimentary rocks in northern Utah for deposits of uranium in Precambrian quartz-pebble conglomerates. Rocks of interest to this study are the thick, clastic sequences within the Uinta Arch that are considered to be of Early Proterozoic age. The Uinta Arch area is known to contain rocks which generally fit the lithologic characteristics that are understood to limit the occurrence of Precambrian fossil placers. However, detailed geology of these rocks and their exact fit to the model described for uraniferous conglomerates was not known. The primary goal of the Uinta Arch Project was to determine how well these Precambrian rocks resemble known deposits and to describe the favorability of placer uranium deposits. (ERA citation 05:034585)

GJBX-172(80) PC **E02**/MF **A01**
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab.
Price 1 exp 0 X 2 exp 0 NTMS Area, Utah. Data Report (Abbreviated).
J. R. Cook. Jul 80, 16p DPST-80-146-9
Contract AC13-76GJ01664

Surface sediment samples were collected at 1444 sites, at a target sampling density of one site per 13 square kilometers. Ground water samples were collected at 137 sites. Neutron activation analysis results are given for uranium and 16 other elements in sediments, and for uranium and 9 other elements in ground water. Mass spectrometry results are given for helium in ground water. Field measurements and observations are reported for each site. Analytical data and field measurements are presented. Data from ground water sites include (1) water chemistry measurements (pH, conductivity, and alkalinity), (2) physical measurements where applicable (water temperature, well description, and scintillometer reading), and (3) elemental analyses (U, Al, Br, Cl, Dy, F, He, Mg, Mn, Na, and V). Data from sediment sites include (1) stream water chemistry measurements from sites where water was available, and (2) elemental analyses for sediment samples (U, Th, Hf, Al, Ce, Dy, Eu, Fe, La, Lu, Mn, Sc, Sm, Na, Ti, V, and Yb). Areal distribution maps, histograms, and cumulative frequency plots for most elements; U/Th, U/Hf, U/(Th + Hf), and U/La ratios; and scintillometer readings at sediment sample sites are included. Uranium concentrations in sediments of the Price quadrangle are relatively low, with a maximum value of 14.7 ppM. The mean of the logs of uranium values in sediments is 0.38, which corresponds to a value of about 2.4 ppM. Many of the lowest uranium concentrations occur in the northern part of the San Raphael Swell, in the southeastern portion of the quadrangle. Ground water sampling sites are too widely dispersed to allow preliminary interpretation. (ERA citation 05:036020)

GJBX-173(80) PC **E02**/MF **A01**
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab.
McDermitt 1 exp 0 X 2 exp 0 NTMS Area, Nevada. Data Report (Abbreviated).
P. A. Thayer, and J. R. Cook. Jul 80, 18p DPST-80-146-10
Contract AC13-76GJ01664

Surface sediment samples were collected at 1337 sites, at a target sampling density of one site per 13 square kilometers. Ground water samples were collected at 255 sites and surface water samples were collected at 41 sites. Neutron activation analysis results are given for uranium and 16 other elements in sediments, and for uranium and 9 other elements in ground water and surface water. Mass spectrometry results are given for helium in ground water. Field measurements and observations are reported for each site. Analytical data and field measurements are presented in tables and maps. Data from ground water and surface water sites include (1) water chemistry measurements (pH, conductivity, and alkalinity), (2) physical measurements where applicable (water temperature, well description, and scintillometer reading), and (3) elemental analyses (U, Al, Br, Cl, Dy, F, Mg, Mn, Na, and V). He analyses are given for ground water. Data from sediment sites include (1) stream water chemistry measurements from sites where water was available, and (2) elemental analyses for sediment samples (U, Th, Hf, Al, Ce, Dy, Eu, Fe, La, Lu, Mn, Sc, Sm, Na, Ti, V, and Yb). Areal distribution maps, histograms, and cumulative frequency plots for most elements; U/Th, U/Hf, U/(Th + Hf), and U/La ratios; and scintillometer readings at sediment sample sites are included. Uranium concentrations in sediments of the McDermitt quadrangle are relatively low, with a maximum value of 20.5 ppM. The mean of the logs of uranium values in sediments is 0.56, which corresponds to a value of about 3.6 ppM. Many of the highest uranium values occur in the Santa Rosa Range and in the Bull Run and Tuscarora Mountains. Most of the higher uranium values occur in areas underlain by tertiary-age granitic intrusive rocks and Tertiary felsic volcanic rocks. Ground water and stream water samples are too widely dispersed to allow for preliminary interpretation. (ERA citation 05:036021)

GJBX-174(80) PC **E02**/MF **A01**
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab.
Wells 1 exp 0 X 2 exp 0 NTMS Area, Nevada. Data Report (Abbreviated).
J. R. Cook. Jul 80, 18p DPST-80-146-11
Contract AC13-76GJ01664

Surface sediment samples were collected at 1336 sites, at a target sampling density of one site per 13 square kilometers. Ground water samples were collected at 112 sites. Neutron activation analysis results are given for uranium and 16 other elements in sediments, and for uranium and 9 other elements in ground water and surface water. Mass spectrometry results are given for helium in ground water. Field measurements and observations are reported for each site. Data from ground water and surface water sites include (1) water chemistry measurements (pH, conductivity, and alkalinity), (2) physical measurements where applicable (water temperature, well description, and scintillometer reading), and (3) elemental analyses (U, Al, Br, Cl, Dy, F, Mg, Mn, Na, and V). Helium analyses are given for ground water. Data from sediment sites include (1) stream water chemistry measurements from sites where water was available, and (2) elemental analyses for sediment samples (U, Th, Hf, Al, Ce, Dy, Eu, Fe, La, Lu, Mn, Sc, Sm, Na, Ti, V, and Yb). Areal distribution maps, histograms, and cumulative frequency plots for most elements; U/Th, U/Hf, U/(Th + Hf), and U/La ratios; and scintillometer readings at sediment sample sites are included. (ERA citation 05:036022)

GJBX-175(80) PC **E05**/MF **A01**
Oak Ridge Gaseous Diffusion Plant, TN.
Stream Sediment Detailed Geochemical Survey for Marysvale, Utah.
T. R. Butz, J. L. Vreeland, C. S. Bard, R. N. Helgerson, and J. G. Grimes. 31 Jul 80, 188p K/UR-42
Contract AC13-76GJ01664

Results of the Marysvale detailed geochemical survey are reported. Field and laboratory data are presented for 397 stream sediment samples and 160 radiometric readings. Statistical and areal distributions of uranium and possible uranium-related variables are displayed. A generalized geologic map of the area is provided, and pertinent geologic factors which may be of significance in evaluating the potential for uranium mineralization are briefly discussed. Stream sediments containing significant amounts of soluble uranium (greater than or equal to 16.93 ppM) occur in numerous areas, the most prevalent being in the western portion of the survey area, within and surrounding the Mount Belknap Caldera. Thorium, beryllium, cerium, manganese, molybdenum, niobium, potassium, yttrium, zinc, and zirconium occur in concentrations greater than or equal to 84th percentile in many sediment samples taken from within and surrounding the Mount Belknap Caldera. The uranium and related variables are associated with highly silicic intrusions and extrusions of the Mount Belknap Volcanics, as well as hydrothermal activity which has occurred in the Marysvale volcanic field. (ERA citation 05:036023)

GJBX-192(80) PC **A07**/MF **A01**
Zellars-Williams, Inc., Lakeland, FL.
Uranium and Thorium Potential of Bayer Process Muds. Final Report.
L. H. Baumgardner. Jul 80, 145p
Contract AC13-76GJ01664

The study of uranium and thorium potential of Bayer Process mud wastes of the aluminum industry was sponsored by the United States Department of Energy. Eight domestic alumina refineries and one abandoned mud impoundment were visited. Both fresh and impounded mud samples were collected and analyzed for uranium and thorium. Correlation of uranium and thorium values with specific bauxite sources was possible at only four plants. Six refineries process a multi-source blend of bauxites. Jamaican muds contained 40 ppM U sub 3 O sub 8 , the highest uranium content found. Maximum thorium values of 300 ppM occurred in a mud derived from a Surinam, Guyana, and Sierra Leone blended ore. Acid extraction of less than 50 percent of the total U sub 3 O sub 8 in some mud samples emphasizes the need for additional research on leaching. Mineralogical study is also recommended. (ERA citation 05:036035)

JHU/APL-QM-80-102 PC **A03**/MF **A01**
Johns Hopkins Univ., Silver Spring, MD. Applied Physics Lab.
Geothermal Energy Development in the Eastern United States: Technical Assistance Report No. 5. Geothermal Space Heating-Naval Air Rework Facility, Norfolk, Virginia.
F. K. Hill, and R. W. Henderson. Jun 80, 40p
Contract AI01-79ET27025

The electronic integration hangar, designated LP-167, was selected for study, as it was a single-story building with a large floor area. Because of the high ceiling and the sliding doors necessary to admit aircraft, the heat loss rate, based on floor area, was about twice that of commercial buildings. It was furnished with an oil-fired hot water heating system capable of high thermal output to meet heating requirements in the coldest weather. On the basis of the known characteristics of geothermal sources for the Atlantic Coastal Plain, and wells drilled and assayed in the Norfolk area, a reasonable estimate of the parameters of a well drilled at NARF was made. This included a low

temperature output from the well of only 107 exp 0 F, so that direct transfer of warm water between the wellhead heat exchanger (HX) and the hot water radiating system in the building was not practical. Four design options are explored and calculations are presented on each one. (ERA citation 05:036572)

LA-8457-MS PC **A03**/MF **A01**
Los Alamos Scientific Lab., NM.
Overview of the National Uranium Resource Evaluation Hydrogeochemical and Stream Sediment Reconnaissance Program.
S. L. Bolivar. Jul 80, 27p
Contract W-7405-ENG-36

A Hydrogeochemical and Stream Sediment Reconnaissance (HSSR) for uranium is currently being conducted throughout the conterminous United States and Alaska. The HSSR is part of the National Uranium Resource Evaluation sponsored by the US Department of Energy. This ambitious geochemical reconnaissance program is conducted by four Department of Energy Laboratories: Los Alamos Scientific Laboratory, Lawrence Livermore Laboratory, Oak Ridge Gaseous Diffusion Plant, and Savannah River Laboratory. Each laboratory was assigned a geographic region of the United States. The program is based on an extensive review of world literature, reconnaissance work done in other countries, and pilot studies conducted by each laboratory. Sample-collection methods and sample density are determined to optimize the probability of detecting potential uranium mineralization. To achieve this aim, each laboratory has developed independent standardized field collection procedures that are designed for its section of the country. Field parameters such as pH, conductivity, climate, geography, and geology are recorded at each site. Most areas are sampled at densities of one sample site per 10 to 23 km exp 2 . The HSSR program has helped to improve existing hydrogeochemical reconnaissance exploration techniques. In addition to providing industry with data that may help to identify potential uranium districts and to extend known uranium provinces, the HSSR also provides multielement analytical data that can be used in water quality, soil, sediment, environmental, and base-metal exploration studies. (ERA citation 05:034587)

LBL-10686 PC **A11**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Earth Sciences Division. Annual Report 1979.
Jul 80, 239p
Contract W-7405-ENG-48

This annual report contains articles describing the research programs conducted during the year. Major areas of interest include geothermal exploration technology, geothermal energy conversion technology, reservoir engineering, geothermal environmental research, basic geosciences studies, applied geosciences studies, nuclear waste isolation, and marine sciences. (ERA citation 05:034765)

LBL-8648 PC **A12**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Earth Sciences Division. Annual Report 1978.
1978, 258p
Contract W-7405-ENG-48

Progress is reported on geothermal energy development, geosciences, and underground nuclear waste management. Fifty-one energy-related projects are listed by title for EDB. (ERA citation 05:036508)

M-78-17 PC **A06**/MF **A01**
MITRE Corp., McLean, VA. METREK Div.
GELCOM: A Geothermal Levelized Busbar Cost Model. Description and User's Guide.
J. N. Gupta, and J. G. Leigh. Jan 78, 125p
Contract AC01-77ET28505

The model described is designed to project the costs of electricity generated from liquid dominated hydrothermal resources. It is presented in the form of an interactive computer program called GELCOM, written in Fortran IV, together with an analytic explanation of the methodology. GELCOM starts from resource data and estimates the capital and operating costs for the production field and electrical generating plant. The methodology implemented in GELCOM to determine the engineering cost, operating parameter estimates, and the levelized busbar cost is described. The output displayed by GELCOM for one prospect is explained. The input data files maintained in the computer system and the input data card formats are included. A sample session with GELCOM and the economic reports which may be generated from the GELCOM are illustrated. A completed listing of the computer program is given in an appendix. (ERA citation 05:034801)

MTCH-PR-9-79 PC **A05**/MF **A01**
Department of Energy, Washington, DC. Div. of Fossil Fuel Extraction.
Transport.
1979, 90p

A list of research and development projects in surface and underground mine haulage is given with the following format: agency name (initials), agency project No., agency's project title, synopsis (objective, proposed method, and progress), project leader, associated organizations, funding date of start and expected or actual finish date. (ERA citation 05:035930)

MTR-7689 PC **A06**/MF **A01**
MITRE Corp., McLean, VA. METREK Div.
Comparative Analysis of Energy Costing Methodologies.
A. H. El-Sawy, J. G. Leigh, and R. K. Trehan. Feb 79, 113p
Contract AC01-77ET28505

The methodologies used for computing levelized busbar costs of electricity from geothermal (hydrothermal) resources used by 16 organizations active in the geothermal area are discussed. The methodologies are compared by (a) comparing the results obtained by using two standard data sets, (b) a theoretical analysis of the mathematical formulation of the embedded models, and (c) an examination of differences in data and assumptions. The objective is to attempt to resolve differences in estimates of geothermal (and conventional) electric power costs, upon which policies may be formulated and research, development and demonstration activities designed and implemented. (ERA citation 05:034808)

MTR-7689(App.) PC **A04**/MF **A01**
MITRE Corp., McLean, VA. METREK Div.
Comparative Analysis of Energy Costing Methodologies. Appendix: Report on Levelized Busbar-Costing Workshop Held at MITRE/Metrek, June 29-30, 1978.
J. G. Leigh. Feb 79, 75p
Contract AC01-77ET28505

The proceedings of a workshop on levelized busbar costing methodologies which was held at MITRE/Metrek on June 29 and 30, 1978 are described. Particular emphasis was placed on consideration of geothermal energy sources. The objective of the workshop was to determine whether a consensus could be developed regarding the most appropriate methodologies and assumptions for levelized energy costing. The workshop was attended by representatives from energy resource, utility and engineering design companies, and by representatives of the Division of Geothermal Energy and R and D contractors for this Division. It was found that year-by-year calculations in current dollars were generally preferred, using either Discounted Cash Flow or Revenue Requirements methods. No consensus emerged on choice of discount rate or financial parameters such as debt/equity ratio, and tax credit carry forward/carry back provisions. It was felt that engineering aspects deserve close attention. (ERA citation 05:036542)

ORO-5959-T1 PC **A10**/MF **A01**
Texas Univ. at Austin. Center for Energy Studies.
Geopressured-Geothermal Energy Development: Government Incentives and Institutional Structures.
D. O. Frederick, D. C. L. Prestwood, K. Roberts, and J. H. Vanston, Jr. 1979, 207p
Contract FG05-78OR05959

The following subjects are included: a geothermal resource overview, the evolution of the current Texas geopressured-geothermal institutional structure, project evaluation with uncertainty and the structure of incentives, the natural gas industry, the electric utility industry, potential governmental participants in resource development, industrial users of thermal energy, current government incentives bearing on geopressured-geothermal development, six profiles for utilization of the geopressured-geothermal resources in the mid-term, and probable impacts of new government incentives on mid-term resource utilization profiles. (ERA citation 05:034798)

PB81-114985 MF **A01**
National Research Council, Washington, DC.
Surface Mining of Non-Coal Minerals.
Nov 79, 375p ISBN-0-309-02942-2
Library of Congress catalog card no. 79-91887.
Sponsored in part by Council on Environmental Quality, Washington, DC.
Microfiche copy only.

This report discusses mineral mining from the perspective of the Surface Control and Reclamation Act of 1977.

PB81-116261 Not available NTIS
National Bureau of Standards, Washington, DC.
Application of a New Raman Microprobe Spectrometer to Nondestructive Analysis of Sulfate and Other Ions in Individual Phases in Fluid Inclusions in Minerals.
G. J. Rasasco, and E. Roedder. 1979, 9p
Pub. in Geochimica et Cosmochimica Acta 43, p1907-1915 1979.

Rosasco et al. reported the first successful application of laser-excited Raman spectroscopy for the identification and nondestructive partial analysis of individual solid, liquid, and gaseous phases in selected fluid inclusions. The authors report here the results of the application of a new instrument, based on backscattering, that eliminates many of the previous stringent sample limitations and hence greatly expands the range of applicability of Raman spectroscopy to fluid inclusions. Fluid inclusions in many prophyry copper deposits contain 5-10 micrmeter 'daugther' crystals thought to be anhydrite but too small for identification by the previous Raman technique. Using the new instrument, they have verified that such daughter crystals in quartz from Bingham, UT, are anhydrite. They may form by leakage of hydrogen causing internal autooxidation of sulfide ion. Daughter crystals were also examined in apatite (Durango, Mexico) and emerald (Muzo, Columbia). Valid analyses of sulfur species in solution in small fluid inclusions from ore deposits would be valuable, but are generallyimpossible by conventional methods. They present a calibration procedure for analyses for SO4 = in such inclusions from Bingham, UT (12,000 + or - 4000 ppm) and Creede, CO (probably <500 ppm). A fetid Brazilian quartz, originally thought to contain liquid H2S, is shown to contain only HS(-) in major amounts.

PNL-3468 PC **A02**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Separate Effects Test Stand for Obtaining Hydrotransport Data.
C. H. Allen. Aug 80, 25p
Contract AC06-76RL01830

Based on earlier hydrotransport research by English and Russian researchers, a special test stand has been designed and constructed to obtain data to determine hydraulic drag, pipe wear, and comminution of particles. These data are intended for design and separate-effects operating information. This information will be used to supplement data developed by the Hydrotransport Research Facility located at the Pittsburgh Mining Operations, Pittsburgh, Pennsylvania. This report describes the equipment as designed, explains how the hydraulic drag is calculated using test-stand data, and presents some preliminary tests results using water. Tests using water are continuing to further substantiate the system and later, tests will be started using slurries. (ERA citation 05:033233)

SAND-80-0857C PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.

Dynamic Rock Fragmentation: Oil Shale Applications.
R. R. Boade, D. E. Grady, and M. E. Kipp. 1980, 12p CONF-801052-1
Contract AC04-76DP00789
Society for Experimental Stress Analysis meeting, Ft Lauderdale, FL, USA, 12 Oct 1980.

Explosive rock fragmentation techniques used in many resource recovery operations have in the past relied heavily upon traditions of field experience for their design. As these resources, notably energy resources, become less accessible, it becomes increasingly important that fragmentation techniques be optimized and that methods be developed to effectively evaluate new or modified explosive deployment schemes. Computational procedures have significant potential in these areas, but practical applications must be preceded by a thorough understanding of the rock fracture phenomenon and the development of physically sound computational models. This paper presents some of the important features of a rock fragmentation model that was developed as part of a program directed at the preparation of subterranean beds for in situ processing of oil shale. The model, which has been implemented in a two-dimensional Lagrangian wavecode, employs a continuum damage concept to quantify the degree of fracturing and takes into account experimental observations that fracture strength and fragment dimensions depend on tensile strain rates. The basic premises of the model are considered in the paper as well as some comparisons between calculated results and observations from blasting experiments. (ERA citation 05:035992)

8J. Physical Oceanography

AD-A091 151/1 MF **A01**
Naval Ocean Research and Development Activity, NSTL Station, MS.
Operation and Maintenance Manual for the XBT Data Acquisition System.
Technical note,
Clifford R. Holland, Bruce E. Eckstein, Robert C. Jackson, and Donith A. Johnson. Feb 80, 152p Rept no. NORDA-TN-60
See also Rept. no. NORDA-TN-58.
Availability: Microfiche copies only.

The expendable bathythermograph (XBT) device is used extensively to obtain ocean temperature profiles at selected locations. Relatively recent interest in the mixing and energy propagation mechanisms of the upper mixed layers of the ocean requires the collection of thermal data at rates and accuracies greatly exceeding the capability of commercially available XBT equipment. The purpose, then, of this development was the creation of a very flexible system that could be software programmed to collect XBT data from one to four probes falling simultaneously or in rapid succession at data rates of up to 20 samples per second per probe. The system resolution is 0.01 deg C. This manual describes the functional operation, interconnections for system set-up, calibration procedures, and library operating programs of the developed system.

AD-A091 172/7 PC **A10**/MF **A01**
Oregon State Univ., Corvallis. School of Oceanography.
Towed Thermistor Chain Observations in JASIN,
R. J. Baumann, C. A. Paulson, and J. Wagner. Jul 80, 208p Rept nos. DATA-80, REF-80-14
Contracts N00014-76-C-0067, N00014-79-C-0004

Observations of temperature and pressure between 10 and 70 m depth were taken with a towed thermistor chain during late August and early September, 1978, about 400 km northwest of Scotland as a part of the JASIN Experiment. The chain was usually towed at a speed of 3 m/s around a 15-km square centered at 59 deg. N, 12 deg. 30'W. On two occasions tows were made around five-km squares as part of coordinated observations involving several ships. The observations were averaged over sequential 30-second intervals and isotherm depths were interpolated from the averaged observations. Cross-sections of temperature and isotherm depth are presented. Spectra of the depth of the lowest and highest isotherm of each cross-section are also presented. (Author)

AD-A091 186/7 PC **A02**/MF **A01**
Naval Ocean Research and Development Activity, NSTL Station, MS.
Oceanographic Management and Information System (OMIS): The Navy Oceanographic Program, Database.
Technical note,
S. Wasowski. Sep 80, 14p Rept no. NORDA-TN-67

The Navy's Oceanographic Program (NOP) contains many diverse projects in a wide variety of scientific and technological disciplines. The NOP database is a collection of information pertaining to the current projects of the Navy's oceanographic community, the objective of the database is to provide an information tool to management. Data elements include project title, performing organization and principal investigator, sponsor, program element funding, and a classification of the project's purpose using a closed vocabulary keywork system. (Author)

AD-A091 239/4 PC **A05**/MF **A01**
Kansas Univ./Center for Research, Inc., Lawrence. Remote Sensing Lab.
Radar Scatterometer Measurements of Sea Ice: The SURSAT Experiment.
Technical rept.,
C. V. Delker, R. G. Onstott, and R. K. Moore. Aug 80, 99p Rept no. CRINC/RSL-TR-331-17
Contract N00014-76-C-1105

The radar backscatter properties of sea ice were measured using both a surface-based and a helicopter-borne scatterometer system. Thick first-year sea ice, thin first-year sea ice, brackish sea ice, and fresh-water inland lake ice were investigated. These ice sites were located off or near the Canadian coast at Tuktoyaktuk, N.W.T., Canada. This paper describes the field experiment, documents the sensors used, and presents the result obtained. Measurements in the 8-18 GHz region verify the ability of radar to distinguish between the different ice types. For angles of incidence greater than 40 degrees VV polarization and 9 GHz frequency appear to provide the best discrimination capability. A strong correlation between radar scattering cross-section and the salinity of ice was observed. Higher salinity ice types produced higher scattering coefficients. Effects of snow cover on lake ice was also investigated. Removal of the snow cover produced significantly lower scattering coefficients which demonstrates the importance of snow cover as a parameter in the radar backscatter return mechanisms of ice.

AD-A091 358/2 PC **A02**/MF **A01**
Lamont-Doherty Geological Observatory, Palisades, NY.
Crustal Structure of the North Atlantic on the Basis of Large-Airgun-Sonobuoy Data.
Journal article,
R. E. Houtz. 8 Jun 79, 10p Rept no. LDGO-2975
Contract N00014-75-C-0210
Pub. in Geological Society of America Bulletin, Part I, v91 p406-413 Jul 80.

No abstract available.

N81-10510/8 PC **A04**/MF **A01**
Foersvarets Forskningsanstalt, Stockholm (Sweden).
Applications of Remote Sensing to Oceanography and Sea Ice.
R. Thoren. 1980, 70p FOA-B-60001-M7
Presented at 14TH Congr. Of the Intern. Soc. Of Photogrammetry on Oceanog. And Sea Ice, Hamburg, 13-26 Jul. 1980.

The program of an interdisciplinary artic expedition for scientific studies is described. Included among the subjects to be studied are: ice conditions; ice-ocean interaction in the marginal ice zone; radar measurements of backseatter from September sea ice; and glacial extent and climatic variations. The problem of navigation hazards due to icebergs and the ice surveillance by advanced remote sensors are discussed. The possibility of under-ice navigation is summarized with respect to remote sensor developments.

PB81-119315 PC **A12**/MF **A01**
Woods Hole Oceanographic Institution, MA. Marine Policy and Ocean Management Program.
Remote Sensing in the Coastal and Marine Environment: Proceedings of the U.S. North Atlantic Regional Workshop (1st) Held at West Greenwich, Rhode Island on May 30-June 1, 1979.
Technical rept.,
James B. Zaitzeff, Peter Cornillon, and David A. Aubrey. Oct 80, 259p WHOI-80-10
Contract NAS13-112
Also pub. as Rhode Island Univ., Kingston. Center for Ocean Management Studies rept. no. URI-P853.

This report consists of invited presentations that were grouped in the following categories: (1) a technical orientation of earth resources remote sensing, including data sources and processing, (2) a review of the present status of remote sensing technology applicable to the coastal and marine environment, (3) a description of data and information needs of selected coastal and marine activities and (4) an outline of plans for marine monitoring systems for the U.S. East Coast and a concept for an East Coast remote sensing facility. Also discussed were user needs and remote sensing potentials in the areas of coastal processes and management, commercial and recreational fisheries, and marine physical processes.

PB81-124919 PC **A14**/MF **A01**
National Oceanic and Atmospheric Administration, Boulder, CO. Environmental Data and Information Service.
A Climatologic and Oceanographic Analysis of the Georges Bank Region of the Outer Continental Shelf.
Final rept.,
Fredric A. Godshall, Robert G. Williams, Joseph M. Bishop, Fred Everdale, and Steven W. Fehler. Sep 80, 302p NOAA-80100808
Sponsored in part by Bureau of Land Management, Washington, DC.

The results of an environmental study of the Georges Bank and Gulf of Maine Outer Continental Shelf areas are described. Study products include: (1) Summaries of historical meteorological and oceanographic data from the study region; (2) Interpretation and analysis of the summaries and a description of the marine environment; (3) Conclusions, drawn from the analyses, that provide information concerning environmental processes and data limitations; and (4) Recommendations for future analyses and for use of analytical procedures.

8K. Seismology

AD-A091 158/6 PC **A03**/MF **A01**
Teledyne Geotech, Alexandria, VA. Seismic Data Analysis Center.
Detection of Depth Phases Using Computer Graphics.
Technical rept.,
John H. Goncz, and Brian W. Barker. 5 Dec 78, 41p Rept no. SDAC-TR-78-8
Contract F08606-78-C-0007, DARPA Order-2551

From a dataset of 116 earthquakes, all available SRO (Special Research Observatory) and PSWF (Preliminary Signal Waveform File) waveforms were presented on an interactive computer graphics screen and then examined for presence of depth phases pP, sP and PcP. Using the results, a focal depth for 66% of the total was postulated. About half of these, or 37%, agreed with depths published by NEP (Network Event Processor) or PDE (Preliminary Determination of Epicenter) bulletins. Earthquakes of magnitude m sub b > 5 are likely to produce clear depth phases. Rapid routine processing of a large number of events by the aligned-on-P method can be achieved with interactive computer graphics.

DOE/ER/02534-6 PC **A05**/MF **A01**
Massachusetts Inst. of Tech., Cambridge.
Seismological Investigation of Crack Formation in Hydraulic Rock Fracturing Experiments and in Natural Geothermal Environments. Progress Report, September 1, 1979-August 31, 1980.
K. Aki. Sep 80, 93p
Contract AS02-76ER02634

Progress is reported in the following research areas: a synthesis of seismic experiments at the Fenton Hill Hot-Dry-Rock System; attenuation of high-frequency shear waves in the lithosphere; a new kinematic source model for deep volcanic tremors; ground motion in the near-field of a fluid-driven crack and its interpretation in the study of shallow volcanic tremor; low-velocity bodies under geothermal areas; and operation of event recorders in Mt. St. Helens and Newberry Peak with preliminary results from them. (ERA citation 05:036521)

8L. Snow, Ice, and Permafrost

AD-A090 865/7 Not available NTIS
Texas Inst. for Computational Mechanics, Austin.
Efficient Solution of Nonlinear Time-Dependent Problems with Applications to Permafrost Modeling,
Linda J. Hayes, and Graham F. Carey. 1980, 9p
ARO-16207.6-GS
Contract DAAG29-79-C-0081
Availability: Pub. in Cold Regions Science and Technology, v3 p185-192 1980 (No copies furnished by DTIC/NTIS).

No abstract available.

8M. Soil Mechanics

PB81-121451 PC **A04**/MF **A01**
Rutgers - The State Univ., New Brunswick, NJ. Dept. of Soils and Crops.
Chemical and Microbiological Impact of Sewage Sludge on Soil Systems.
Final completion rept.,
Lowell A. Douglas. Oct 80, 69p W81-00275, OWRT-A-038-NJ(3)
Contract DI-14-31-0001-5030

The organic carbon decomposition and nitrogen transformation of two sewage sludges in a sandy loam soil were studied utilizing incubation experiments at temperatures from 8 to 22C. An 'active organic carbon' fraction decomposed at a higher rate than the bulk of the organic carbon. Q10 values for organic carbon were between 1.6 and 2 and varied with sludge type and sludge/soil ratios. The decomposition of the two sludges in soil was not significantly different at field capacity or at saturated moisture conditions. A regression model in the form of an exponential function between the CO2 evolution and the factors of time, temperature and rate of carbon added was developed, with a good fit to observed values. A simulation model for the transformation of nitrogen based on first and zero order kinetics was developed for the incubation study.

9. ELECTRONICS AND ELECTRICAL ENGINEERING

9A. Components

AD-A090 869/9 Not available NTIS
Texas Univ. at Austin. Dept. of Electrical Engineering.
Spectral Domain Immitance Approach for Dispersion Characteristics of Generalized Printed Transmission Lines,
Tatsuo Itoh. 26 Oct 79, 5p ARO-16171.8-EL
Grant DAAG29-78-G-0145
Availability: Pub. in IEEE Transactions on Microwave Theory and Techniques, vMTT-28 n7 p733-736 Jul 80 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A091 185/9 PC **A03**/MF **A01**
Naval Ocean Research and Development Activity, NSTL Station, MS.
Kevlar Coaxial Cable Development,
Kenneth M. Ferer. Jun 79, 44p Rept no. NORDA-20

The primary objective of this program is to develop a reliable 8.5 kilometer length of reinforced, torque-free coaxial cable with the ability to endure many thousands of bending cycles over small diameter sheaves. A braided, aramid fiber, Kevlar-reinforced, coaxial cable that had outstanding performance characteristics was developed for this specific application.

CONS-3015-T6 PC **A08**/MF **A01**
Gould-Brown Boveri, Colmar, PA.
Superconducting Fault Current Limiter. Sixth Quarterly Technical Progress Report, November 8, 1979-February 7, 1980.
1980, 155p
Contract ET-78-C-01-3015

Progress in developing an improved superconducting fault current limiter (SCFCL) is described. A mathematical model of the most promising SCFCL design was used for determining transient characteristics, thermal recovery characteristics, and for evaluating types of shunt resistors. Some experimental work was done on Nb sub 3 Sn film properties. (ERA citation 05:036642)

EPRI-EL-1518 PC **A07**/MF **A01**
General Cable Corp., Union, NJ.
Development of 500-KV AC Cable Employing Laminar Insulation of Other Than Conventional Cellulosic Paper. Final Report.
G. Bahder, G. S. Eager, Jr., J. J. Walker, and A. F. Dima. Sep 80, 138p
Contract AC01-76ET29252

The results of an investigation to develop a 500 kV ac laminar dielectric power cable and joint having insulation with lower losses than conventional cellulosic paper insulation are presented. Background information is presented on proposed low-loss synthetic and composite synthetic/cellulosic paper insulations. From these studies, fibrous polypropylene paper tape and cellulosic paper-polypropylene film-cellulosic paper composite paper (PPP) were chosen. Extensive testing of hand-wrapped cable models fabricated with each type of tape served to eliminate the fibrous polypropylene paper tape from further consideration. Cable model tests indicate that the PPP tape is satisfactory for insulation in 500 kV ac cable, and that oil impregnants now used in conventional cellulosic paper insulated cables are unsuitable, but that silicone oil with an additive is satisfactory for PPP tapes. Laboratory data indicate that it may be necessary with the PPP tapes to use a significantly lower viscosity impregnating oil which has a greater tendency to drain from pipe-type cables than conventional oil. This may require a modification of the moisture seal. Four final pipe-type cables having a conventional moisture seal were manufactured for possible future field testing. The dielectric loss of the final cables is one-fifth that of conventional cellulosic paper insulated cables. The estimated installed cost per MVA-mile of the PPP insulated cable, neglecting losses, is higher than cellulosic insulated cables impregnated with conventional mineral oil. However, the capacitance of the cable insulated with PPP tape is 25% lower than conventional cable, and therefore, the reactance necessary to compensate for the cable charging current is significantly reduced. (ERA citation 05:036641)

GEPP-TIS-503 PC **A03**/MF **A01**
General Electric Co., St. Petersburg, FL. Neutron Devices Dept.
Axial Compression Testing of Vacuum Tube Glass-Ceramic/Molybdenum Frames.
R. K. Spears. 17 Sep 80, 34p
Contract AC04-76DP00656

The strength of a vacuum tube subassembly is affected by many factors, including the subassembly design, the process used to bond the parts, and the type of equipment used to measure the strength. In this study, these variables were examined for a subassembly consisting of a molybdenum sleeve, a glass-ceramic insulator, and a molybdenum cylindrical frame. Results showed that compression testing of different designs ranged from 765 to 3170 pounds. No difference appeared in the strength of subassemblies due to variations in selected steps in processing. A self-aligning compression test fixture resulted in higher strength readings than those obtained with conventional fixturing. (ERA citation 05:035181)

GEPP-TIS-516 PC **A02**/MF **A01**
General Electric Co., St. Petersburg, FL. Neutron Devices Dept.
Microstructure Examination of the Interface of the Glass-Ceramic Insulator of the Molybdenum Frame of a Vacuum Tube.
R. K. Spears. 17 Sep 80, 12p
Contract AC04-76DP00656

A common technique used in examining the structural integrity of a glass-ceramic insulator-molybdenum cylinder bond in a vacuum tube subassembly is to slit the outer molybdenum cylinder and separate it from the glass-ceramic insulator. Typically, a black glassy layer (0.001 to 0.002 in. thick) remains on the cylinder. This layer has been interpreted as a requirement for an adequate seal. A subassembly was found that did not exhibit this feature. Further investigation of approximately 100 subassemblies revealed four more parts lacking a black glassy layer. These parts were found to be from two production runs and from three glass-ceramic lots. A microstructural analysis showed that on those parts having a black glassy layer, the crystalline phase in the glass-ceramic grew to within one to two microns of the metal interface and then terminated. A dark region existed in the insulator between the interface and the termination of the crystalline phase. This was attributed to molybdenum oxide dissolved in the glass. On those parts where the glass-ceramic broke clean from the cylinder, the crystalline phase extended up to the metal. Also observed on these parts was the appearance of a dark region adjacent to the metal that extended approximately one to two microns into the glass-ceramic. This was assumed to be an oxide of molybdenum. This report presents information concerning the microstructure of the interface. (ERA citation 05:035199)

PAT-APPL-6-191 744 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Pasadena, CA. Pasadena Office.
Control Means for a Solid State Crossbar Switch.
Patent Application,
T. O. Anderson. Filed 29 Sep 80, 20p N80-33679/5, NASA-CASE-NPO-15066-1
Contract NAS7-100
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A control system for a solid state crossbar switch is described which allows a number of switch control and interrogation functions to be implemented by time sharing related circuitry. The crossbar switch includes a number of X ports and Y ports.

Each X-Y port intersection designates a specific X-Y intersection latch which controls a number of associated switches for interconnecting one set of data lines associated with the X port to another set of data lines associated with the Y port. The control system continuously and sequentially addresses each of the X-Y intersection latches at a 10 megahertz rate. During this continual and sequential addressing, the control circuitry includes a capability for (1) interrogating each intersection latch for determining which are in a set condition; (2) ensuring that only one X-Y intersection latch is set on an X row and Y column defining that latch; (3) resetting all of the X-Y intersection latches; and (4) determining which of the X-Y intersection latches are in a set condition.

SAND-80-1763 PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Progress Report on GaP, Grown Junction, High Temperature Diodes.
R. J. Chaffin. Aug 80, 25p
Contract AC04-76DP00789

This memo discusses current results of an effort to develop GaP (Gallium Phosphide) diodes for high temperature, > 275 exp 0 C, applications. It discusses the theory, fabrication and testing of devices made at Sandia National Laboratories. (ERA citation 05:036954)

9B. Computers

AD-A090 826/9 PC **A13**/MF **A01**
Rome Air Development Center, Griffiss AFB, NY.
The Specification of a Data Base Machine Architecture Development Facility and a Methodology for Developing Special Purpose Function Architectures,
Raymond A. Liuzzi. Jul 80, 288p Rept no. RADC-TR-80-256

This research is concerned with specifying the set of components/tools needed in a Data Base Architecture Development (DMAD) Facility. A methodology is described to illustrate how this proposed facility can be used to develop special purpose function architectures (SPFAs). These SPFAs perform a data base management function in hardware that is currently performed in software on a sequential computer. This methodology includes a series of processes which are the select candidate function process and the create, test, evaluate, and substitute SPFA processes. Each process can be performed with a series of procedures that utilize tools/components of the DMAD facility. The select candidate function process would use the facility to help choose candidate DBMS functions to be moved from software to hardware. For this process, assume that a data base management system (DBMS) executes on an emulated computer system in the facility. Software modules that comprise the DBMS and provide the DMBS functions would be studied as logical candidates to be moved into hardware. When a candidate is chosen one or more SPFAs may be chosen as replacements. This choice is made by developing these SPFAs as machines, using the facility and comparing their performance for a specific application.

AD-A090 831/9 PC **A02**/MF **A01**
Georgia Inst. of Tech., Atlanta. School of Information and Computer Science.
Mutation Analysis as a Tool for Software Quality Assurance.
Interim technical rept.,
Richard A. DeMillo. Oct 80, 7p Rept no. GIT-ICS-80/11
Contracts DAAG29-80-C-0120, N00014-79-C-0231

A protocol for using mutation analysis as a tool for software quality assurance is described. The results of experiments on the reliability of this method are also described. (Author)

AD-A090 949/9 PC **A02**/MF **A01**
Brown Univ., Providence, RI. Dept. of Computer Science.
Interactive Computer Graphics.
Final rept. 1 Jan 75-30 Jun 80,
Andries van Dam. 24 Oct 80, 11p
Contract N00014-75-C-0427
Continuation of Contract N00014-67-A-0191-0023.

The goal of our research in distributed processing is to evolve fundamental concepts as well as implementation techniques for improving system performance by judicious runtime distribution of functions to processors and to levels of a hierarchical operating system. This distribution of computing tasks among the various processors in a network or among the many levels of a hierarchical operating system in a single computer is a critical issue in current and future military, industrial and educational computer systems. Our approach is to provide the applications programmer with tools that allow both the estimation of performance improvements of potential migrations, either horizontal (inter-processor) or vertical (intra-processor), and the implementation of the most promising migrations. (Author)

AD-A090 962/2 PC **A04**/MF **A01**
TRW Defense and Space Systems Group, Redondo Beach, CA.
Airborne Systems Software Acquisition Engineering Guidebook for Microprocessors and Firmware.
Final rept.,
T. Winslow. Feb 80, 72p TRW-30323-6018-TU-00, ASD-TR-80-5021
Contract F33657-76-C-0677

This report is one of a series of guidebooks whose purpose is to assist Air Force Program Office and Engineering personnel in the acquisition and engineering of airborne systems software. This guidebook provides guidance in planning the acquisition and support of microprocessor and microprocessor based firmware embedded in airborne systems. It provides definition of terminology and concepts along with guidance in selecting, planning, organizing, staffing, managing and controlling microprocessor and firmware embedded in systems. It provides detailed guidance for the acquisition, management and support of microprocessors and firmware. It identifies the responsibilities of the participating organizations and discusses methods, products and problems. (Author)

AD-A090 963/0 PC **A04**/MF **A01**
TRW Defense and Space Systems Group, Redondo Beach, CA.
Airborne Systems Software Acquisition Engineering Guidebook for Software Development Planning and Control.
Final rept.,
R. Oldham. Feb 80, 67p TRW-30323-6017-TU-00, ASD-TR-80-5022
Contract F33657-76-C-0677

This report is one of a series of guidebooks whose purpose is to assist Air Force Program Office and Engineering personnel in the acquisition and engineering of airborne systems software. This guidebook discusses the documents, methods and procedures for use in planning, monitoring, controlling and reporting weapon system acquisitions involving software development. It emphasizes the importance of planning and discusses the dynamic of the planning process along with the associated planning documents. It describes the role, use and relationship of the Program Management Plan, Procurement Plan, Test and Evaluation Master Plan, Computer Program Development Plan, Configuration Management Plan, Quality Assurance Plan, Computer Resources Integrated Support Plan and the Operational/Support Configuration Management Procedures. It stresses that plans are the basis for monitoring and controlling software development programs. (Author)

AD-A090 964/8 PC **A05**/MF **A01**
TRW Defense and Space Systems Group, Redondo Beach, CA.
Airborne Systems Software Acquisition Engineering Guidebook for Software Testing and Evaluation.
Final rept.,
M. Barry. Mar 80, 79p TRW-30323-6011-TU-00, ASD-TR-80-5023
Contract F33657-76-C-0677

This guidebook assists Air Force Program Office engineering and management personnel in interpreting and applying the principles of Software Testing and Evaluation to the acquisition of airborne systems software. The guidebook describes the planning and testing activities necessary to insure successful software testing. It presents checklists and references to supplement information in government documents and to summarize data from professional journals and books. (Author)

AD-A090 965/5 PC **A05**/MF **A01**
TRW Defense and Space Systems Group, Redondo Beach, CA.
Airborne Systems Software Acquisition Engineering Guidebook for Requirements Analysis and Specification.
Final rept.
Sep 78, 77p TRW-30323-6013-TU-00, ASD-TR-79-5027
Contract F33657-76-C-0677

This report is one of a series of guidebooks which provide guidance to the acquisition management and engineering of Airborne Systems software procured under Air Force 800-series regulations. It describes the derivation, analysis, and documentation of airborne software requirements. (Author)

AD-A090 966/3 PC **A07**/MF **A01**
TRW Defense and Space Systems Group, Redondo Beach, CA.
Airborne Systems Software Acquisition Engineering Guidebook for Verification, Validation, and Certification.
Final rept.,
D. J. Reifer. Sep 78, 127p TRW-30323-6009-TU-00, ASD-TR-79-5028
Contract F33657-76-C-0677

This report is one of a series of guidebooks which provide guidance to the acquisition management and engineering of Airborne Systems software procured under Air Force 800-series regulations. It provides working-level Air Force Program Office engineering and management personnel with information that will help them plan, specify, and monitor independent computer program Verification, Validation and Certification (VV&C) activities. (Author)

AD-A091 015/8 PC **A06**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Lab. for Computer Science.
A Semantics of Synchronization.
Master's thesis,
Carl R. Seaquist. S .p 80, 115p Rept no. MIT/LCS/TM-176
Contract N00014-75-C-0661, Grant NSF-MCS78-17698

This paper presents a rigorous framework to discuss the synchronization necessary to coordinate accesses to a resource. The framework, among other things, provides a method for specifying concurrency and forms the semantic basis of a synchronization mechanism which avoids certain unfortunate characteristics of monitors and serializers. Synchronization is viewed as being managed by a resource guardian. A synchronization problem is defined as a predicate on event sequences. The interaction of a guardian and the rest of the system is formalized in terms of a two person game. This formalization results in precise definitions of guardian and guardian behavior. The notion of a 'good' or optimal solution is defined, and the solutions to certain classes of synchronization problems are characterized. An abstract description of the general actions of a guardian is given. This general description, with some restrictions, forms the basis of a simple synchronization mechanism for actually implementing solutions. The mechanism is given a rigorous semantics based on the definition of guardian. This facilitates the verification of correctness. Many examples of the use of the mechanism are given and its advantages are discussed. (Author)

AD-A091 029/9 PC **A09**/MF **A01**
Georgia Inst. of Tech., Atlanta. School of Information and Computer Science.
On Mutation.
Doctoral thesis,

Alien Troy Acree, Jr. Aug 80, 184p Rept no. GIT-ICS-80/12
Contracts DAAG29-80-C-0120, N00014-79-C-0231

Program Mutation is a method for testing computer programs which is effective at uncovering errors and is less expensive to apply than other techniques. Working mutation systems have demonstrated that mutation analysis can be performed at an attractive cost on realistic programs. In this work, the effectiveness of the method is studied by experiments with programs in the target application spaces. (Author)

AD-A091 043/0 PC **A06**/MF **A01**
Delaware Univ., Newark. Dept. of Computer and Information Sciences.
A Case Study in Natural Language Processing: The RUS System.
Master's thesis,
Arthur William Mansky. May 80, 123p AFOSR-TR-80-1035
Contract F49620-79-C-0131

The RUS system (Bobrow, 1978) is a new parser for English which allows semantically directed parsing by interleaving calls to a separate, independent semantic component with syntatic processing in a case-oriented ATN grammar. This thesis discusses the syntactic component (RUS), the points at which it calls a semantic component, and the nature of the syntactic-semantic interaction occurs, the nature of the interaction, and the structure of the dictionary are the only assumptions placed on the semantic component. (Author)

AD-A091 044/8 PC **A03**/MF **A01**
Maryland Univ., College Park. Computer Science Center.
Fitting Random Field Models to Images.
Interim rept.,
R. Chellappa. Aug 80, 43p CSC-TR-928, AFOSR-TR-80-1037
Grant AFOSR-77-3271

This paper deals with fitting two-dimensional stationary random field (RF) models to images. We assume that the given image is represented on a torus lattice, obeying an R.F. model driven by uncorrelated noise. The stochastic model is characterized by a set of unknown parameters. We describe two sets of experimental results. First, by assigning values to parameters in the stationary range, two-dimensional patterns are generated. It appears that quite a variety of patterns can be generated. Next we consider the problem of estimating the parameters, given an arbitrary image. By assuming a Gaussian structure for the noise, we given an iterative scheme to estimate the unknown parameters. We also implement a decision rule to choose an appropriate set of neighbors for the image. The theory is illustrated by applying it to synthetic patterns. (Author)

AD-A091 045/5 PC **A02**/MF **A01**
Maryland Univ., College Park. Computer Science Center.
Three-Dimensional Digital Topology.
Interim rept.,
Azriel Rosenfeld. Sep 80, 24p CSC-TR-936, AFOSR-TR-80-1038
Grant AFOSR-77-3271

Basic concepts of connectedness, cavities, and holes are defined for subsets of three-dimensional arrays. Three-dimensional arcs and curves are also defined and characterized. (Author)

AD-A091 055/4 PC **A03**/MF **A01**
Naval Postgraduate School, Monterey, CA.
Experiments with Voice Input for Command and Control: Using Voice Input to Operate a Distributed Computer Network.
Technical rept.,
Gary K. Poock. Apr 80, 49p Rept no. NPS55-80-016

This report describes an experiment in which military officers used voice recognition equipment to verbally enter commands to a computer network similar to that of a command and control center, or a shipboard information center. Results suggest that voice input can result in faster operation and fewer errors for such activities and give the operator more time to do other things. In addition, operators are very comfortable using voice input because of the more natural man-machine interface. (Author)

AD-A091 060/4 PC **A15**/MF **A01**
Naval Postgraduate School, Monterey, CA.
NPS MICRO-COBOL an Implementation of a Subset of ANSI-COBOL for a Microcomputer System.
Master's thesis,
Hal R. Powell. Jun 80, 337p

A compiler for a subset of the Automated Data Processing Equipment Selection Office (ADPESO), HYPO-COBOL, has been implemented on a microcomputer. The implementation provides nucleus level constructs, interprogram communications, and file options from the ANSI COBOL package along with the PERFORM UNTIL, PERFORM VARYING and an enhanced version of the IF-THEN-ELSE construct that includes nesting and multiple program statements for both the 'THEN' and 'ELSE' clauses. These additional constructs from level two of ANSI COBOL provide for more flexibility and increased structural control. The language was implemented through a compiler and run-time package executing under the CP/M operating system of a Z-80 or an 8080 microcomputer-based system. Both the compiler and interpreter can be executed in 20K bytes of main memory. A program consisting of 5K bytes of symbol table entries can be supported on this size machine. Modification of the compiler and interpreter programs can be accomplished to take advantage of larger machines. The programs that make up the compiler and interpreter package require 50K bytes of disk storage. (Author)

AD-A091 092/7 PC **A07**/MF **A01**
Naval Postgraduate School, Monterey, CA.
An Implementation of Multiprogramming and Process Management for a Security Kernel Operating System.
Master's thesis,
Stephen Leslie Reitz. Jun 80, 141p

This thesis presents an implementation of multiprogramming and process management functions for the security kernel of a distributed multiprocessor system. The implementation is based on a family of operating systems designed to provide controlled access in a microcomputer network to data bases containing multiple levels of sensitive information. Multiprogramming improves system efficiency and creates a virtual environment which frees the remainder of the operating system from a dependence on processor configuration. Processor management coordinates the asynchronous interaction of system processes. This implementation describes a processor multiplexing technique for distributed kernel and presents a virtual interrupt mechanism. Its structure is loop free to permit future expansion into more complex members of the design family. (Author)

AD-A091 098/4 PC **A02**/MF **A01**
University of Southern California, Los Angeles. Dept. of Aerospace Engineering.
Nonlinear Filtering Algorithms for Vector Processing Machines,
Richard S. Bucy, and Kenneth D. Senne. Jun 79, 24p AFOSR-TR-80-0978
Grant AFOSR-76-3100, Contract F44620-76-C-0085
Pub. in Computation and Mathematics with Applications, v6 p317-338 1980. Prepared in cooperation with Massachusetts Inst. of Tech., Lexington. Lincoln Lab.

No abstract available.

AD-A091 144/6 PC **A03**/MF **A01**
Carnegie-Mellon Univ., Pittsburgh, PA. Dept. of Computer Science.
A Performance-Reliability Model for Computing Systems,
Xavier Castillo, and Daniel P. Siewiorek. 10 Jan 80, 26p
Contract DASG60-79-C-0043

In this paper some measures are presented that characterize both the performance and reliability of digital computing systems in time sharing environments from a user viewpoint. The measures (Apparent Capacity and Expected Elapsed Time required to correctly execute a given program) are based on a mathematical model built upon traditional assumptions. The model is a hybrid in that is uses statistics gathered from a real system while giving analytical expressions for other statistics such as the Expected Elapsed time. The main parameters of the model are the system workload and the distribution of the time between errors. Although still limited because of the restrictive assumptions used, the model gives quantitative results about how much a user can expect from a time sharing system, as a function of the system workload and reliability. For example, this study measured a four to one range in mean time to system failure as a function of system load. For the maximum load period measured the model predicts a 40 % contribution from system unreliability to expected computation time for a program that could require 30 minutes of CPU time in an unloaded situation. (Author)

AD-A091 176/8 PC **A04**/MF **A01**
Electronics Research Lab., Adelaide (Australia).
The Adaptation and Installation of the Resource Access Control Facility (RACF).
Technical rept.,
J. L. Roughan, and J. C. Gwatking. Apr 80, 62p Rept no. ERL-0136-TR

The Resource Access Control Facility (RACF) is a software package designed to control access by users to a computer system and to data stored on the system. This report describes the modifications and additions to the functions of RACF which were made during its installation in the computing centre at the Defence Research Centre. RACF is described in sufficient detail to allow the operation of the modifications to be clearly explained. The report also summarizes the functions and standards of the computing centre and lists the actions taken to accommodate users with non-standard requirements.

AD-A091 177/6 PC **A06**/MF **A01**
Stanford Univ., CA. Dept. of Computer Science.
Prototypes and Production Rules: A Knowledge Representation for Computer Consultations.
Doctoral thesis,
Janice S. Aikins. Aug 80, 110p Rept nos. STAN-CS-80-814, HPP-80-17
Contract MDA903-77-C-0322, Grant PHS-RR-00785-07
Report on Heuristic Programming Project.

This thesis presents a system called CENTAUR, which demonstrates the effectiveness of representing prototypical knowledge in a combination of frames and production rules for performing computer consultations. Key knowledge representation and control structure problems in production rule systems similar to MYCIN are identified, and a set of important characteristics of the structures used for representing problem-solving knowledge is given. CENTAUR's frames, or prototypes, complement the production rules to satisfy these characteristics and represent expected patterns of data that permit a more focused, hypothesis-directed approach to problem solving. Among the characteristics identified as desirable in the representation structures are the ability to explicitly represent (a) prototypical cases, (b) the context in which knowledge is applied, and (c) the strategies for applying that knowledge. CENTAUR's prototypes consist of patterns of knowledge in the domain which serve as broad contexts, guiding the more detailed processing of the production rules. Strategies for the consultation, or control knowledge, are represented in the prototypes separately from other kinds of domain knowledge. This allows the domain expert to specify control knowledge that is specific to each prototype. Examples are presented which demonstrate how this explicit representation facilitates explanations of the system's reasoning. Further, the organization of knowledge in CENTAUR provides a useful framework for acquiring new knowledge.

AD-A091 183/4 PC **A05**/MF **A01**
Stanford Univ., CA. Dept. of Computer Science.
Basic Research in Artificial Intelligence and Foundations of Programming.
Final rept.,

John McCarthy, Thomas Binford, David Luckham, Zohar Manna, and Richard Weyhrauch. May 80, 76p Rept nos. STAN-CS-80-808, AIM-337
Contract MDA903-76-C-0206, ARPA Order-2494

This report describes recent research in several related areas. Basic research in artificial intelligence and formal reasoning addresses fundamental problems in the representation of knowledge and reasoning processes applied to this knowledge. Solution of these problems will make possible the development of analytical applications of computers with large and complex data bases, where current systems can handle only a very restricted set of data structures and queries. Mathematical theory of computation studies the properties of computer programs. The goal is to provide a sound theoretical basis for proving correctness or equivalence of designs. The goal of program verification is to improve the reliability of important classes of programs such as compilers, operating systems and realtime control systems, and to standardize techniques for program construction, documentation and maintenance. Image understanding is aimed at mechanizing visual perception of three-dimensional objects either from photographs or from passive imaging sensors. Advances in this field are expected to lead to much more efficient photointerpretation capabilities as well as automatic visual guidance systems.

AD-A091 190/9 PC **A05**/MF **A01**
General Research Corp., Santa Barbara, CA.
JOVIAL J73 Automated Verification System - Study Phase.
Final technical rept. Sep 79-Apr 80,
Carolyn Gannon. Aug 80, 95p RADC-TR-80-261
Contract F30602-79-C-0265

This report presents the results of a study to specify the required capabilities and high-level design of an automated tool to support the testing and verification of JOVIAL J73 software systems. Included is a state-of-the-art review of software testing and verification with emphasis on techniques applicable to JOVIAL J73 programs. (Author)

AD-A091 213/9 PC **A02**/MF **A01**
Center for Naval Analyses Alexandria VA Operations Evaluation Group
Evaluation of Computer Software in an Operational Environment.
Professional paper,
Gregory H. Watson. Aug 80, 24p Rept no. OEG-PP-290
Presented at the Joint National Meeting of the Institute for Management Science (TIMS) and the Operations Research Society of America (ORSA), 5 May 80, Washington, DC.

This paper examines general procedures for testing military realtime operational software from the user's perspective. A summary of industrial software testing is given with an evaluation of its applicability to the military's requirement for operational testing. The operational test environment is examined to determine the extent of verification, validation or certification of computer software that is possible given the constraints of this environment. (Author)

AD-A091 218/8 PC **A02**/MF **A01**
Purdue Univ., Lafayette, IN. Dept. of Electrical Engineering.
Use of the Augmented Data Manipulator Multistage Network for SIMD Machines.
S. Diane Smith, Howard J. Siegel, Robert J. McMillen, and George B. Adams, III. Aug 80, 5p AFOSR-TR-80-1034
Grant AFOSR-78-3581
Pub. in Proceedings of the International Conference on Parallel Processing (1980), p75-78 Aug 80. Prepared in cooperation with Wisconsin Univ., Madison. Dept. of Electrical and Computer Engineering.

No abstract available.

AD-A091 220/4 PC **A02**/MF **A01**
California Univ., Los Angeles. Graduate School of Management.
Impact of Development Productivity Aids on Application System Maintenance.
Bennet P. Lientz, and E. Burton Swanson. 1980, 10p
Contract N00014-75-C-0266
Pub. in Data Base, p114-120 1980.

No abstract available.

AD-A091 238/6 PC **A02**/MF **A01**
Defence Research Establishment Valcartier (Quebec).
Image Enhancement by Spectral Ratioing.
J. F. Boulter. Jun 80, 22p Rept no. DREV-R-4170/80
Abstract in French.

In a reflectivity image, contrast produced by differences in surface material is often of more interest than that produced by differences in surface orientation or illumination. The latter factors may be difficult to predict or to allow for in practice. We show that, in certain cases, contrast caused by differences in surface orientation and illumination may be reduced or eliminated by dividing an image obtained in one spectral band by one obtained in a different spectral band. We illustrate this technique by enhancing the images of military vehicles recorded on color film, and by enhancing man-made objects in an aerial multispectral scanner image relative to vegetation. (Author)

AD-A091 242/8 PC **A02**/MF **A01**
Hawaii Univ., Honolulu. Dept. of Electrical Engineering.
Computer Organization and Information Hiding.
Interim rept. no. 3,
Rahul Chattergy. 15 Jul 80, 18p
Contract DASG60-79-C-0118

A new internal organization of a computer is proposed by applying the principle of information hiding to the structure of a computer. The new organization is inspected in the light of the requirements set forth on computer organization by Functional Programming systems. The current status of the implementation of such a computer and the future directions of research are mentioned. (Author)

AD-A091 244/4 PC **A03**/MF **A01**
Air Force Weapons Lab., Kirtland AFB, NM.
A Solution to the Large Code Problem on the AFWL Scientific Computers.
Final rept.,
Robert W. Berry. Sep 80, 27p AFWL-TR-80-20, AD-E200 584

This report addresses the issue of executing large and long running codes on the Air Force Weapons Laboratory large-scale scientific computers, and the problem of obtaining results in a reasonable amount of time with minimum cost. Impact on other users is discussed as well as inefficiencies resulting from the diverse job mix on the large machines. The ALFA code is used to present cost information relating to the current mode of operation. An alternative to this mode of operation is offered. A 32-bit minicomputer system which uses a virtual memory addressing scheme and incorporates fast, large capacity disk storage, suitable 1/0 equipment, sufficient high speed main memory, and a powerful attached array processor is recommended. This system would be used in dedicated mode by one user at a time. The cost advantages of this approach are presented, and continuing actions on this project are recommended.

AD-A091 247/7 PC **A04**/MF **A01**
Army Armament Research and Development Command, Aberdeen Proving Ground, MD. Ballistics Research Lab.
User's Manual for the BRL Subroutine to Evaluate Sine, Cosine, and Exponential Integrals for Complex Argument.
Technical rept.,
James N. Walbert, and Emma M. Wineholt. Aug 80, 73p ARBRL-TR-02255, AD-E430 514

The formulas used in the BRL Sine, Cosine and Exponential Integral subroutine are derived in sufficient detail to enable the user to correctly implement the computer code. Estimates of precision, sample output, and an annotated listing of the computer code are included in the appendices.

AD-A091 253/5 PC **A03**/MF **A01**
Army War Coll., Carlisle Barracks, PA.
Software Management,
Philip S. Threefoot. 28 May 80, 32p

The purpose of the paper is to outline practical management techniques tailored to the uniqueness of software development. The central theme is visibility into the software development and the ways to achieve it. The areas of documentation, testing, personnel, configuration management, and incentives are examined. The techniques described were developed while managing the software for the Tactical Fire Direction System, a software intensive, command and control system containing approximately one million lines of source code. (author)

AD-A091 270/9 PC **A06**/MF **A01**
SRI International, Menlo Park, CA.
The SRI International Hierarchical Development Handbook. Volume I. The Foundations of HDM.
Technical document,
W. Linwood Sutton, and Lawrence Robinson. Jun 79, 102p NOSC-TD-366-VOL-1
Contract N00123-76-C-0195
See also Volume 2, AD-A091 271.

HDM (the SRI Hierarchical Development Methodology) is an approach to software development that attempts to structure the overall development process by providing a unified framework that addresses most aspects of system development. Volume I of the HDM Handbook describes the basic concepts of HDM and shows how these concepts have been embodied in a computational model. It also presents procedures and guidelines for using them to produce a software system. (Author)

AD-A091 271/7 PC **A06**/MF **A01**
SRI International, Menlo Park, CA.
The SRI International Hierarchical Development Handbook. Volume II. The Languages and Tools of HDM.
Technical document,
W. Linwood Sutton, Brad A. Silverberg, Lawrence Robinson, and Karl N. Levitt. Jun 79, 110p NOSC-TR-366-VOL-2
Contract N00123-76-C-0195
See also Volume 3, AD-A091 272.

HDM (the SRI Hierarchical Development Methodology) is an approach to software development that attempts to structure the overall development process by providing a unified framework that addresses most aspects of system development. Volume II of the HDM Handbook provides a self-contained description of the languages of HDM and the principal online tools. The primary language of HDM is the module specification language SPECIAL (Specification and Assertion Language). SPECIAL embodies the concepts of HDM described in Volume I. (Author)

AD-A091 272/5 PC **A08**/MF **A01**
SRI International, Menlo Park, CA.
The SRI International Hierarchical Development Handbook. Volume III. A Detailed Example in the Use of HDM.
Technical document,
W. Linwood Sutton, Karl N. Levitt, Lawrence Robinson, and Brad A. Silverberg. Jun 79, 175p NOSC-TD-366-VOL-3
Contract N00123-76-C-0195
See also Volume 1, AD-A091 270.

HDM (the SRI Hierarchical Development Methodology) is an approach to software development that attempts to structure the overall development process by providing a unified framework that addresses most aspects of system development. Volume III of the HDM Handbook illustrates the application of HDM to the development of a non-trivial system. The example system is developed step-by-step, the languages of HDM are presented, and the decisions actually made during system development are described. (Author)

AD-A091 301/2 PC **A05**/MF **A01**
New York Univ., NY. Courant Inst. of Mathematical Sciences.
Internal, External, and Pragmatic Influences: Technical Perspectives in the Development of Programming Languages.
Technical survey,

Jacob T. Schwartz. Jul 80, 76p Rept no. TS-020
Contract N00014-78-C-0639

This paper reviews key issues likely to shape the design and development of programs and programming languages as efficiency constraints relax and computational power increases. These issues are; (1) the use of the dictions of mathematics to define operations that can be used to achieve user-defined desires and expectations concerning an intended application; (2) techniques for designing and producing the expected results: the use of very-high-level programming languages for prototyping; the development of application-oriented languages; the design of applications using standard operations; and the development of a library of modules which handle substantial fragments of important applications; and (3) a language's usefulness, i.e., its general nature and its user-oriented features. (Author)

AD-A091 313/7 PC **A04**/MF **A01**
Stanford Univ., CA. Dept. of Computer Science.
An Extended Semantic Definition of Pascal for Proving the Absence of Common Runtime Errors.
Technical rept.,
Steven M. German. Jun 80, 62p Rept nos. STAN-CS-80-811, PVG-18
Contracts MDA903-80-C-0159, F30602-80-C-0022

We present an axiomatic definition of Pascal which is the logical basis of the Runcheck system, a working verifier for proving the absence of runtime errors such as arithmetic overflow, array subscripting out range, and accessing an uninitialized variable. Such errors cannot be detected at compile time by most compilers. Because the occurrence of a runtime error may depend on the values of data supplied to a program, techniques for assuring the absence of errors must be based on program specifications. Runcheck accepts Pascal programs documented with assertions, and proves that the specifications are consistent with the program and not runtime errors can occur. Our axiomatic definition is similar to Hoare's axiom system, but it takes into account certain restrictions that have not been considered in previous definitions. For instance, our definition accurately models uninitialized variables, and requires a variable to have a well defined value before it can be accessed. The logical problems of introducing the concept of uninitialized variables are discussed. Our definition of expression evaluation deals more fully with function calls than previous axiomatic definitions. Some generalizations of our semantics are presented, including a new method for verifying programs with procedure and function parameters. Our semantics can be easily adopted to similar languages, such as ADA. One of the main potential problems for the user of a verifier is the need to write detailed, repetitious assertions. We develop some simple logical properties of our definition which are exploited by Runcheck to reduce the need for such detailed assertions. (Author)

AD-A091 353/3 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Image Restoration by Short Space Spectral Subtraction.
Journal article,
Jae S. Lim. 22 Feb 79, 8p JA-4943, ESD-TR-80-182
Contract F19628-80-C-0002
Pub. in IEEE Transactions on Acoustics, Speech, and Signal Processing, vASSP-28 n2 p191-197 Apr 80.

No abstract available.

AD-A091 366/5 Not available NTIS
Colorado State Univ., Fort Collins. Dept. of Electrical Engineering.
Stochastic Boundary Estimation and Object Recognition,
D. B. Cooper, H. Elliott, F. Cohen, L. Reiss, and P. Symosek. 1980, 32p ARO-15409.7-M
Contract N00014-75-C-0518, Grant DAAG29-78-G-0124
Prepared in cooperation with Brown Univ., Providence, RI. Sponsored in part by Grant NSF-ENG77-26788.
Availability: Pub. in Computer Graphics and Image Processing, v12 p326-356 1980 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A091 372/3 PC **A04**/MF **A01**
Mission Research Corp., La Jolla, CA.
RAM Technology Study.
Topical rept. 1 Feb-31 Dec 79,
James P. Raymond. 3 Jan 80, 57p MRC/SD-R-52, DNA-5163T
Contract DNA001-79-C-0137

Electrical performance and radiation hardness parameters of modern RAM technologies were compared for consideration in military hardened system applications. Semiconductor technologies considered included production dynamic n-MOS, statis n-MOS, CMOS, bipolar ECL developing CMOS/SOS and bipolar I2L. For the production technologies CMOS and bipolar ECL are clear candidates for hardened systems with limited application for static n-MOS and very limited application for dynamic n-MOS. (Author)

AD-A091 384/8 PC **A06**/MF **A01**
Stanford Univ., CA. Dept. of Computer Science.
On the Design, Use, and Integration of Data Models.
Doctoral thesis,
Ramez Aziz El-Masri. May 80, 120p Rept no. STAN-CS-80-801
Contract MDA903-76-C-0206

In spite of the large number of data models that have been proposed, no consensus exists about what concepts are really important for data modeling. Presentations of the various models cite the advantages of their approach, and discuss what the model best can represent. The advantages of different approaches when they include ease of representation, ease of implementation, naturalness of expression, power of query language, nonprocedurality of query language, expression of structural constraints, efficiency of implementation, formal foundations, support of existing implemented models,... etc. Another problem encountered when we attempt to compare models is that not all models are defined at the same level. For example, hierarchical and network models include numerous implementation details. The relation model does not include any inter-relation constraints. Although some real-world constraints are captured by functional, multi-valued, and other dependencies, no systems represent these constraints except the functional dependencies that result form the primary keys of relations. The entity-relationship model is claimed to be a real-world model, rather than an information structure model, as are semantic and binary relationship models - does that imply these models cannot or should not be used for database implementation. This thesis, is concerned with data models at the information structure level, rather than at the real-world semantic level. However, we want the information structure data model that we use to be able to capture many of the semantic concepts of the real-world that it models, as well as to support a query language which is close to the way users perceive the real-world to be organized (to a certain extent).

AD-A091 385/5 PC **A04**/MF **A01**
McDonnell Douglas Astronautics Co., Huntington Beach, CA.
Metrics of Software Quality.
Annual rept. (Final) 1 Jun 79-31 May 80,
Z. Jelinski, and P. B. Moranda. Aug 80, 53p
AFOSR-TR-80-1010
Contract F49620-77-C-0099

The software required to test FORTRAN programs, first with random numbers and then by preselected constructed cases, was developed during this interval. Software modifications were made to permit performance measurements of the degree of coverage to include the results due to the use of constructed cases. The automation of the mix of random numbers and constructed cases was studied and limitations were found. Two new models for use during the development phase of programming were developed. These models apply to programs which grow in size during the debugging period.

BMFT-FB-DV-79-05 PC **A11**/MF **A01**
Bundesministerium fuer Forschung und Technologie, Bonn-Bad Godesborg (Germany, F.R.).
Holographic Associative Memories in Document Retrieval Systems.
P. J. Becker, H. Bolle, A. Keller, W. Kistner, and W. D. Riecke. Mar 79, 231p
In German.
U.S. Sales Only.

The objective of this work was the implementation of a holographic memory with associative readout for a document retrieval system. Taking advantage of the favorable properties of holography - associative readout of the memory, parallel processing in the response store - may give shorter response times than sequentially organized data memories. Such a system may also operate in the interactive mode including chain associations. In order to avoid technological difficulties, the experimental setup made use of commercially available components only. As a result an improved holographic structure is proposed which uses volume holograms in photorefractive crystals as storage device. In two chapters of appendix we give a review of the state of the art of electrooptic devices for coherent optical data processing and of competing technologies (semiconductor associative memories and associative program systems). (Atomindex citation 11:514746)

JAERI-M-8253 PC **A07**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
EISPACK-J: Subprogram Package for Solving Eigenvalue Problems. Development and Benchmark Test of SSL, No. 8.
T. Fujimura, and T. Tsutsui. May 79, 133p
In Japanese.
U.S. Sales Only.

EISPACK-J, a subprogram package for solving eigenvalue problems, has been developed, and subprograms with a variety of functions have been prepared. These subprograms can solve standard problems of complex matrices, general problems of real matrices and special problems in which only the required eigenvalues and eigenvectors are calculated. They are compared to existing subprograms, showing their features through benchmark tests. Many test problems, including realistic scale problems, are provided for the benchmark tests. Discussions are made on computer core storage and computing time required for each subprogram, and accuracy of the solution. The results show that the subprograms of EISPACK-J, based on Householder, QR and inverse iteration methods, are the best in computing time and accuracy. (Atomindex citation 11:518688)

JINR-11-12423 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Neutron Physics.
Free-Running System for Correlation Analysis of UCN Using a CAMAC Microprocessor Controller.
I. P. Barabash, E. Yu. Gubarev, O. I. Elizarov, K. Kissig, and V. E. Novozhilov. 1979, 8p
In Russian.
U.S. Sales Only.

Free-running CAMAC system for acquisition and handling of information obtained in the correlation spectroscopy of UCN is described. The control of the system is performed by the crate controller based on the K580180 microprocessor. The operation program is stored in a reprogrammable memory device (REPROM) and occupies 1024 bites, 380 of which are intended to correlating function calculation subroutine. For synchronization of the neutron beam beam modulation with channels of the time coder (TC) a coder is performed with a variable channel width. TC has 127 channels. The minimum difference between the start signal and the end of the 127 time channel, leading to channel width change of 1 mu s, is equal to 127 mu s. This value is less than 01% of the channel width at the 1024 mu s operating channel width. Recording of detector pulses is performed only if this difference is less than 127 mu s. Results of total system testing are presented. (Atomindex citation 11:528918)

ND-R-264(R) PC **A04**/MF **A01**
UKAEA, Risley (England). Nuclear Power Development Establishment.

Simplified User's Guide for Two Dimensional Heat Transfer and Elastic Stress Analyses Using the UNCLE Finite Element Programs TAU and CAUSE.
N. G. Smith. Jul 79, 51p
U.S. Sales Only.

The simplified input is based on a SINGLE CELL ARRAY format in which the hierarchical input required by UNCLE becomes effectively similar to that of most other finite element programs. Since a wide variety of engineering problems can be solved using two dimensional plane stress, plane strain and axi-symmetric idealisations, this self contained user's guide is restricted to the corresponding elements available in the elastic stress analysis program CAUSE and the complementary heat transfer program TAU. However, this form of input can be used for three dimensional problems and also by other UNCLE based finite element programs. (Atomindex citation 11:525703)

N81-10507/4 PC **A12**/MF **A01**
Societe Nationale Industrielle Aerospatiale, Cannes (France).
Use of Color Techniques for Image and Experimental Data Processing Etudes des Techniques de Couleur pour le Traitement des Donnees Images et Experimentales.
M. Albuisson, R. Dupre, G. Lebegue, and J. M. Monget. Oct 79, 253p ESA-CR(P)-1294
Contract ESOC-3583/79
Text in French. Original Contains Color Illustrations.

Methods, algorithms and instruments allowing the use of color techniques for the processing of information incoming from satellites are described. Various methods of optical data processing are surveyed and applied to LANDSAT satellite images, METEOSAT satellite telemetry measurement, and GEOS satellite experimental data. Color treatment material presently available on the market is examined. The main characteristics of a simplified system for color data processing are outlined.

N81-10702/1 PC **A03**/MF**A01**E
Foersvarets Forskningsanstalt, Stockholm (Sweden).
Visual Effects of Sampling in Digital Picture Processing. A Pilot Study.
L. Linde, H. Marmolin, and S. Nyberg. Feb 80, 33p FOA-C-53001-H9

Experiments were designed to study how sampling distortions due to aliasing and band limitation are perceived and affect image quality. Sampling effects were investigated with two different scenes. The first experiment comprised ratings of subjective similarity between pictures processed with different combinations of prefiltering and sample frequency. The second experiment comprised subjective ratings of similarity between pictures processed with different combinations of white Gaussian noise and sample frequency. The similarities were analyzed by a multidimensional scaling technique (INDSCAL). The multidimensional analyses indicated that the subjective sampling effects could appear as unhomogeneous noise texture (false spots), illdefined contours, displaced contours or loss of pattern elements; however, the saliency of each dimension was found to depend on scene properties.

N81-10744/3 PC **A08**/MF **A01**
Ecole Nationale Superieure des Telecommunications, Paris (France). Dept. Systemes et Communications.
Structural Recognition of Manuscript Characters Reconnaissance Structurelle de Caracteres Manuscrits.
Q. N. Huyn. May 79, 173p ENST-H-79004
Text in French.

The simulation program was written in FORTRAN. It was tested on a reference base composed of figures obtained from the Munson base, containing 100 figures of each class. The method generates two levels of graph from which cavities are extracted. Further measurements are made as the decision graph is traced. The binary matrices of the base have a resolution of 24 x 24. On an Iris 80 computer, the machine processing time per character was 0.3 sec. A 3.5% error level was obtained. The reject level was 2.5%.

ORNL/TM-7504 PC **A08**/MF **A01**
Oak Ridge National Lab., TN.
Development and Comparison of Algorithms for Generating a Scan Sequence for a Random Access Scanner.
R. O. Eason. Sep 80, 169p
Contract W-7405-ENG-26

Many data acquisition systems incorporate high-speed scanners to convert analog signals into digital format for further processing. Some systems multiplex many channels into a single scanner. A random access scanner whose scan sequence is specified by a table in random access memory will permit different scan rates on different channels. Generation of this scan table can be a tedious manual task when there are many channels (e.g. 50), when there are more than a few scan rates (e.g. 5), and/or when the ratio of the highest scan rate to the lowest scan rate becomes large (e.g. 100:1). An algorithm is developed which will generate these scan sequences for the random access scanner and implements the algorithm on a digital computer. Application of number theory to the mathematical statement of the problem led to development of several algorithms which were implemented in FORTRAN. The most efficient of these algorithms operates by partitioning the problem into a set of subproblems. Through recursion they solve each subproblem by partitioning it repeatedly into even smaller parts, continuing until a set of simple problems is created. From this process, a pictorial representation or wheel diagram of the problem can be constructed. From the wheel diagram and a description of the original problem, a scan table can be constructed. In addition, the wheel diagram can be used as a method of storing the scan sequence in a smaller amount of memory. The most efficient partitioning algorithm solved most scan table problems in less than a second of CPU time. Some types of problems, however, required as much as a few minutes of CPU time. 26 figures, 2 tables. (ERA citation 05:037456)

PAT-APPL-6-198 537 PC **A02**/MF **A01**
Department of Transportation, Washington, DC.
Public-Access Information System Terminal.
Patent Application,
Lothar Frenkel, and Mark Gorstein. Filed 20 Oct 80, 20p PB81-116691, DOT/CASE-TSC-10154
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The invention relates generally to information retrieval systems, and is particularly concerned with a computer-linked remote terminal unit for providing public access to electronically stored route and schedule information at airports, bus terminals, railway stations and other transportation centers.

PB81-115537 PC **A04**/MF **A01**
SRI International, Menlo Park, CA. Computer Science Lab.
The SRI Hierarchical Development Methodology (HDM) and its Application to the Development of Secure Software.
Final rept.,
Karl N. Levitt, Peter G. Neumann, and Lawrence Robinson. Oct 80, 59p NBS-SP-500-67
Contract NBS-5-35932
Library of Congress catalog card no. 80-600157.

The document provides an introduction to the SRI Hierarchical Development Methodology (HDM). The methodology employs a staged decomposition of the development process, which separates design, data representation, and implementation. For any given system development, HDM employs a hierarchical decomposition of the design and formal specifications of modules and their interconnections. Extensive tools are used throughout the development to check the appropriateness of the design and its implementation. The role of HDM in developing secure systems is considered, and various current efforts using HDM to develop such systems are summarized. The use of the methodology is illustrated by a simple but complete example. A somewhat larger example of part of a secure data management system is also discussed.

PB81-116220 PC **A03**/MF **A01**
Electronics Research Lab., Adelaide (Australia).
Automatic Erasure of Released Disk Space on an IBM 370 Computer Using the MVS Operating System.
Technical rept.,
J. C. Gwatking. Jun 80, 41p ERL-0143-TR, AR-002-005

The standard MVS operating system supplied for use on IBM 360 computers does not erase or protect data residing on areas of disk that have been released for reuse. The report discusses the problem and describes efficient techniques that have been developed and installed at the DRCS which automatically erase all data when disk space is released by its owner. This has involved modifying the disk space management software and included some restructuring to eliminate contention for system resources while data is erased.

PB81-117046 PC **A09**/MF **A01**
National Center for Health Statistics, Hyattsville, MD. Div. of Vital Statistics.
Geographic Code Manual: Codes Used in Computer Processing Effective with 1970 Data.
1970, 198p

The manual itemizes the geographic codes contained in computer tapes beginning with data year 1970. These codes do not conform with codes that were entered in the initial data records. They are recodes of the original coded entries and are designed to facilitate computer processing.

PB81-118671 PC **E03**/MF **A01**
Federal Compiler Testing Center, Washington, DC.
Four-Phase Systems Four-Phase IV/90 Model 2 MFE/IV Release BN03 COBOL '74 Release BE03.
Validation summary rept.
3 Nov 80, 41p CCVS74-VSR710

The Validation Summary Report (VSR) for the Four Phase Systems COBOL Compiler Version BE03 (MFE/IV Version BN03) provides a consolidated summary of the results obtained from the validation of the subject compiler against the 1974 COBOL Standard (X3.23-1974/FIPS PUB 21-1). The compiler was validated at the Low level of FIPS PUB 21-1. The VSR is made up of several sections showing the discrepancies found. These include an overview of the validation which lists all categories of discrepancies by level/module within X3.23-1974, a section relating the categories of discrepancies to each of the Federal levels of the language; and a detailed listing of discrepancies together with the tests which were failed.

PB81-118689 PC **E03**/MF **A01**
Federal Compiler Testing Center, Washington, DC.
DTSS, Incorporated DTSS COBOL.
Validation summary rept.
3 Nov 80, 43p CCVS74-VSR635

The Validation Summary Report (VSR) for the DTSS, Incorporated COBOL Compiler Version 07 (DTSS T.S. Version 07) provides a consolidated summary of the results obtained from the validation of the subject compiler against the 1974 COBOL Standard (X3.23-1974/FIPS PUB 21-1). The compiler was validated at the Low level of FIPS PUB 21-1. The VSR is made up of several sections showing the discrepancies found. These include an overview of the validation which lists all categories of discrepancies by level/module within X3.23-1974, a section relating the categories of discrepancies to each of the Federal levels of the language; and a detailed listing of discrepancies together with the tests which were failed.

PB81-118820 PC **A03**/MF **A01**
Federal Compiler Testing Center, Washington, DC.
International Business Machines Corporation. IBM Series/1 COBOL 5719-CB1, Version 1, Level 2, Realtime Programming System (RPS), Version 4.
Validation summary rept.
Sep 80, 45p CCVS74-VSR690

The Validation Summary Report (VSR) for the IBM Series 1 COBOL Compiler Version 1.2 (RPS Version 4.1) provides a consolidated summary of the results obtained from the validation of the subject compiler against the 1974 COBOL Standard (X3.23-1974/FIPS PUB 21-1). The compiler was validated at the Low-Intermediate level of FIPS

PUB 21-1. The VSR is made up of several sections showing the discrepancies found. These include an overview of the validation which lists all categories of discrepancies by level/module within X3.23-1974, a section relating the categories of discrepancies to each of the Federal levels of the language; and a detailed listing of discrepancies together with the tests which were failed.

PB81-124935 PC **A06**/MF **A01**
National Bureau of Standards, Washington, DC. Inst. for Computer Sciences and Technology.
NBS Software Tools Database,
Raymond C. Houghton, Jr., and Karen A. Oakley. Oct 80, 108p NBSIR-80-2159

The Center for Programming Science and Technology has been compiling data on the availability of software development and testing tools. The data has been placed into a relational database using Pascal/R, a language that extends Pascal by a data relation. The database allows for information retrieval on tool features, languages, developers, documentation, hardware and software requirements, availability, publications, and contacts. The purpose of this report is to put forward the information currently contained in the database for review, assimilation, and update.

PB81-800427 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Relational Data Bases. 1964-November, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-Nov 80,
Jack E. Jones. Nov 80, 71p
Supersedes PB80-800725, and NTIS/PS-78/1086.

Design and development considerations for relational data bases are cited in the bibliography. Advantages of the relational model over hierarchical and network models are discussed. Data structures, data organization, semantic relationships, and data definitions for the relational model are also presented. (This updated bibliography contains 64 citations, 16 of which are new entries to the previous edition.)

SAND-80-0891 PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Two-Stage Nonrecursive Filter/Decimator.
J. R. Yoder, and B. D. Richard. Aug 80, 24p
Contract AC04-76DP00789

A two-stage digital filter/decimator has been designed and implemented to reduce the sampling rate associated with the long-term computer storage of certain digital waveforms. This report describes the design selection and implementation process and serves as documentation for the system actually installed. A filter design with finite-impulse response (nonrecursive) was chosen for implementation via direct convolution. A newly-developed system-test statistic validates the system under different computer-operating environments. (ERA citation 05:037113)

UCRL-52917 PC **A04**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
GRPANL: A Program for Fitting Complex Peak Groupings for gamma and X-Ray Energies and Intensities.
R. Gunnink, and W. D. Ruhter. Jan 80, 62p
Contract W-7405-ENG-48

GRPANL is a general-purpose peak-fitting program that calculates gamma-ray and x-ray energies and intensities from a given spectral region. The program requires that the user supply input information such as the first and last channels of the region, the channels to be used as pre- and post-region background, the system gain and zero-intercept, and a list of approximate energy values at which peaks occur in the region. Because the peak position and peak-shape parameters enter nonlinearly into the peak-fitting algorithm, an iterative least-square procedure is used in the fitting process. The program iterates until either all convergence criteria are met or ten iterations have elapsed. The code described here allows for twenty free parameters and a region as large as 240 data channels. This code runs on an LSI-11 computer with 32K memory and disk-storage capability. (ERA citation 05:035220)

UCRL-84577 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Network User Services and Personnel Issues.
C. Luk. Jun 80, 7p CONF-801105-2
Contract W-7405-ENG-48
Annual user services conference, Morgontown, WV, USA, 16 Nov 1980.

In a network environment, users are remote from the computer center. User services personnel, being the initial and possibly the only contact, represent the computer center to the users. Conversely, they must represent the view of the users to exert the proper influence on the operation of the computer center. With timesharing, users have close contact and scrutiny of system software. This user intimate software should be developed and maintained by user services. Personnel issues for these expanded user services are discussed: staffing, organization, recruiting, training, appraisal, and work satisfaction. (ERA citation 05:037457)

9C. Electrical and Electronic Engineering

AD-A090 828/5 PC **A02**/MF **A01**
Civil Engineering Lab. (Navy), Port Hueneme, CA.
EMCS Modules/Intelligent Time Clock (ITC).
Final rept. 1977-1980,
Dallas Shiroma. Sep 80, 23p Rept no. CEL-TN-1588

The CEL has developed a microprocessor-based intelligent time clock (ITC) for control of HVAC equipment. The ITC has the capability of operating as a stand-alone controller, or as part of a distributed large-scale Energy Monitoring and Control System (EMCS). The ITC has 'intelligence' to monitor actual environmental conditions and to base actual control functions on these data. Evaluation of the ITC has demonstrated that such 'intelligent' control devices can provide significant energy savings over conventional control devices. (Author)

AD-A090 849/1 PC **A08**/MF **A01**
Advisory Group for Aerospace Research and Development, Neuilly-sur-Seine (France).
Fault Tolerance Design and Redundancy Management Techniques.
Sep 80, 175p Rept no. AGARD-LS-109

The pursuit of fault tolerance in avionics systems can have a significant impact on costs and performance of future high performance aircraft. This introduction to Lecture Series No. 109 gives a brief discussion of the motivation for fault tolerance through failure management. The technical scope of the lecture series is also bounded. (Author)

AD-A090 928/3 PC **A02**/MF **A01**
Oakland Univ., Rochester, MI. School of Engineering.
Undetectability of Bridging Faults and Validity of Stuck-at Fault Test Sets,
K. L. Kodandapani, and Dhiraj K. Pradhan. 3 Aug 77, 8p AFOSR-TR-80-0791
Contract F49620-79-C-0119
Pub. in IEEE Transactions on Computers, vC-29 n1 p55-59 Jan 80.

No abstract available.

AD-A091 108/1 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Advanced Electronic Technology.
Quarterly technical summary, 1 Feb-30 Apr 80,
Alan J. McLaughlin, and Alan L. McWhorter. 15 May 80, 22p ESD-TR-80-35
Contract F19628-80-C-0002

Contents: Digital Integrated Circuits; MNOS Memory; Restructurable VLSI; Silicon Processing; Advanced Electronic Technology; Solid State Device Research; Quantum Electronics; Materials Research; Microelectronics; Analog Device Technology.

AD-A091 314/5 PC **A12**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Research Lab. of Electronics.
RLE Progress Report Number 122.
Annual rept. 1 Jan-31 Dec 79,
P. A. Wolff, and J. Allen. Jan 80, 270p
Contract DAAG29-78-C-0020

Contents: Molecule Microscopy, Developmental Electron Optics Laboratory, Semiconductor Surface Studies, Photoemission Spectroscopy, Atomic Resonance and Scattering, Interfacial Chemistry, X-Ray Diffuse Scattering, Quantum Electronics, Time-Resolved Spectroscopy of Condensed Matter, Infrared Nonlinear Optics, Quantum Optics and Electronics, Microwave and Millimeter Wave Techniques, Electronic and Optical Materials and Applications, Microwave Thermography, Radio Astronomy, Electromagnetic Wave Theory and Remote Sensing, Electronic Properties of Charged Centers in SiO2-like Glasses, Photon Correlation Spectroscopy and Applications Research Program, Microstructure Fabrication, Plasma Dynamics, Optical Propagation and Communication, Digital Signal Processing, Speech Communication, Linguistics, Cognitive Information Processing, Custom Integrated Circuits, Communications Biophysics, and Neurophysiology.

N81-10527/2 PC **A05**/MF **A01**
Rockwell International Corp., Columbus, OH.
Satellite Power Systems (Sps) Laser Studies. Volume 1: Laser Environmental Impact Study.
Final Report, Oct. 1978 - Mar 1979.
R. E. Beverly, Iii. Nov 80, 87p NASA-CR-3346, SSD-80-0119-1
Contract NAS8-32475

The environmental impact of space to Earth power transmission using space borne laser subsystems is emphasized. A laser system is defined, estimates of relevant efficiencies for laser power generation and atmospheric transmission are developed, and a comparison is made to a microwave system. Ancillary issues, such as laser beam spreading, safety and security, mass and volume estimates and technology growth are considered.

PB81-116188 PC **A06**/MF **A01**
General Electric Co., Schenectady, NY.
Comparisons between Designs for Single-Sided Linear Electric Motors: Homopolar Synchronous and Induction.
Final rept. on Phase 3, 15 Sep 75-30 Jul 78,
Thomas A. Nondahl, and Eike Richter. Sep 80, 114p FRA/ORD-80/54
Contract DOT-FR-64147

A design study of two types of single-sided (with a passive rail) linear electric machine designs, namely homopolar linear synchronous machines (LSM's) and linear induction machines (LIM's), is described. It is assumed the machines provide tractive effort for several types of light rail vehicles and locomotives. These vehicles are wheel supported and require tractive powers ranging from 200 kW to 3735 kW and top speeds ranging from 112 km/hr to 400 km/hr. All designs are made according to specified magnetic and thermal criteria. The LSM advantages are a higher power factor, much greater restoring forces for track misalignments, and less track heating. The LIM advantages are no need to synchronize the excitation frequency precisely to vehicle speed, simpler machine construction, and a more easily anchored track structure. The relative weights of the two machine types vary with excitation frequency and speed; low frequencies and low speeds favor the LSM. The effect of variations in several LSM design parameters are shown to illustrate trends in machine dimensions, track weight, and commutating reactance. The details of the LSM design programs are described and a Fortran IV listing of the programs is proveded.

PB81-119463 PC **A06**/MF **A01**
General Electric Corporate Research and Development, Schanectady, NY.
Performance of a Single-Sided Linear Induction Motor with Solid Back Iron and With Various Misalignments. Volume 1.
Final rept. on Phase 2, 15 Sep 75-15 May 78,
Gerald B. Kliman, William R. Mischler, and W. Russel Oney. Sep 80, 102p SRD-78-069, FRA/ORD-80/53-1

Contract DOT-FR-64147

A test facility was designed and built to measure all aspects of the performance of a single-sided high-speed linear induction motor with solid back iron over a wide range of frequency, speed, and excitation. The facility was equipped and instrumented to measure all the usual performance parameters plus all of the six-axis forces in normal operation and, when displaced, in the remaining five degrees of freedom (air gap, lateral, pitch, roll, and yaw). Performance in the normal position was compared to the mesh/matrix prediction. Generally good agreement was obtained between measured and predicted values of thrust and efficiency. Differences between predicted and measured thrust (especially at high slips) were related to the solid back iron and skin saturation. Agreement between predicted and measured normal forces was not satisfactory. The six-axis force measuring system was thoroughly analyzed to determine the range of validity of the measurements and the errors inherent in using a sector motor to simulate a flat linear motor.

9D. Information Theory

AD-A090 886/3 PC **A02**/MF **A01**
Texas Univ. at Austin. Electronics Research Center.
Distribution-Free Performance Bounds for Potential Function Rules,
Luc P. Devroye, and T. J. Wagner. 25 Oct 78, 6p AFOSR-TR-80-0798
Contract F49620-77-C-0101, Grant AFOSR-77-3385
Pub. in IEEE Transactions on Information Theory, vIT-25 n5 p601-604 Sep 79.

No abstract available.

AD-A091 111/5 PC **A03**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Iterative Techniques for Minimum Phase Signal Reconstruction from Phase or Magnitude.
Technical note,
Thomas F. Quatieri, and Alan V. Oppenheim. 1 Aug 80, 38p TN-1980-34, ESD-TR-80-91
Contracts F19628-80-C-0002, N00014-75-C-0951

In this report, we develop iterative algorithms for reconstructing a minimum phase sequence from the phase or magnitude of its Fourier transform. The iterative techniques result in two potentially important computational algorithms. The first is a means of implementing the Hilbert transform of the log-magnitude or phase of the Fourier transform of a minimum phase sequence. This procedure avoids problems of phase unwrapping and aliasing inherent in the direct discrete Fourier transform implementation of the Hilbert transform. The second algorithm is a new method of computing samples of the unwrapped phase. As compared with other available phase unwrapping algorithms, this approach does not rely on adding 2 pi multiples to samples of the principal value of the phase. (Author)

AD-A091 181/8 PC **A02**/MF **A01**
Oakland Univ., Rochester, MI. School of Engineering.
Error-Correcting Codes and Self-Checking Circuits,
D. K. Pradhan, and J. J. Stiffler. 1979, 14p AFOSR-TR-80-0792
Contract F49620-79-C-0119
Pub. in Computer Magazine, p27-37 Mar 80.

No abstract available.

AD-A091 188/3 PC **A04**/MF **A01**
American Electronic Labs., Inc., Lansdale, PA.
Walsh Preprocessor.
Final technical rept. 20 Feb 79-31 Mar 80,
James Van Cleave. Aug 80, 70p AEL-10492-4200, RADC-TR-80-253
Contract F30602-79-C-0048
See also Rept. no. RADC-TR-78-82, AD-A055 170.

This report describes a technique and equipment for detecting pulsed signals in a high noise environment. The performance of this technique approaches matched filter techniques for signals where the pulse parameters are not known a-priori. A common problem in the area of signal processing is that of the detection of pulse signals having very low signal-to-noise ratios (SNR). This problem is worsened when major signal parameters (pulse width and time of arrival) are not known. The purpose of this program was to develop an improved exploratory development model of a system to detect the presence of low SNR signals, on a single pulse-by-pulse basis. The technique chosen for this program was the use of the Walsh Transform as the basis for a two transform digital filter. This technique has been demonstrated by AEL as a result of in-house IR/D programs and implemented to USAF preliminary requirements under a previous contract for a Walsh Adaptive Filter (RADC Report TR-78-82 for Contract F30602-76-C-0299). The current program was to further develop the technique and to fabricate a programmable unit suitable for test and evaluation purposes against a variety of potential applications. The system name, Walsh Preprocessor (WP), was derived from the use of a Walsh transform to adaptively filter signals of varying pulse widths and repetition rates.

AD-A091 323/6 Not available NTIS
SACLANT ASW Research Centre, La Spezia (Italy).
High-Resolution Analysis of Non-Stationary Data Ensembles,
Richard Klemm. 1 Oct 80, 8p Rept no. SACLANTCEN-SM-142
Availability: Pub. in Signal Processing: Theories and Applications, p711-714 1980 (no copies furnished by DTIC/NTIS).

No abstract available.

AD-A091 355/8 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Fourier Transform Phase Coding of Images.
Journal article,
Stephen C. Pohlig. 24 Apr 79, 4p JA-4953, ESD-TR-80-184
Contract F19628-80-C-0002
Pub. in IEEE Transactions on Acoustics, Speech, and Signal Processing, vASSP-28 n3 p339-341 Jun 80.

No abstract available.

AD-A091 359/0 PC **A02**/MF **A01**
Texas Univ. at Austin. Dept. of Electrical Engineering.
A Detection Scheme for Dependent Noise Processes,
Don R. Halverson, and Gary L. Wise. 1980, 15p AFOSR-TR-80-1020
Contract F49620-77-C-0101, Grant AFOSR-76-3062
Pub. in Jnl. of the Franklin Institute, v309 p287-300 May 80.

No abstract available.

AD-A091 392/1 Not available NTIS
Colorado State Univ., Fort Collins. Dept. of Electrical Engineering.
Modulo-2 pi Phase Sequence Estimation,
Louis L. Scharf, Dennis D. Cox, and C. Johan Masreliez. 1 May 79, 7p ARO-16437.6-EL
Contracts DAAG29-79-C-0176, N00014-75-C-0518
Availability: Pub. in IEEE Transactions on Information Theory, vIT-26 n5 p615-620 Sep 80 (No copies furnished by DTIC/NTIS).

No abstract available.

9E. Subsystems

AD-A090 870/7 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Wideband LiNbO3 Elastic Convolver with Parabolic Horns.
Journal article,
Richard A. Becker, and Douglas H. Hurlburt. 1979, 4p MS-5049, ESD-TR-80-38
Contract F19628-80-C-0002
Pub. in Ultrasonics Symposium Proceedings, p729-731 Sep 79.

No abstract available.

AD-A090 872/3 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Four-Wave Interactions in Acoustoelectric Integrating Correlators.
Journal article,
Richard w. Ralston, and Ernest Stern. 1979, 7p MS-5059, ESD-TR-80-40
Contract F19628-80-C-0002
Pub. in Ultrasonics Symposium Proceedings, p761-766 Sep 79.

No abstract available.

AD-A090 873/1 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
A SAW Accumulating Correlator with CCD Readout.
Journal article,
Daniel L. Smythe. 1979, 6p MS-5060, ESD-TR-80-41
Contract F19628-80-C-0002
Pub. in Ultrasonics Symposium Proceedings, p771-775 Sep 79.

No abstract available.

AD-A090 884/8 PC **A02**/MF **A01**
Texas Univ. at Austin. Electronics Research Center.
Design and Implementation of Two-Dimensional FIR Digital Filters with Nonrectangular Arrays,
M. T. Manry, and J. K. Aggarwal. 8 Jul 77, 6p AFOSR-TR-80-0796
Contract F49620-77-C-0101, Grant NSF-ENG74-04986
Pub. in IEEE Transactions on Acoustics, Speech, and Signal Processing, vASSP-26 n4 p314-318 Aug 78.

No abstract available.

AD-A090 922/6 PC **A14**/MF **A01**
Martin Marietta Corp Denver CO Failure Analysis Lab
SEM Analysis Techniques for LSI Microcircuits. Volume I.
Final technical rept. 8 Sep 78-8 Feb 80,
J. R. Beall, W. E. Echols, and D. D. Wilson. Aug 80, 312p MCR-80-508-VOL-1, RADC-TR-80-250-VOL-1
Contract F30602-78-C-0354
See also Volume 2, AD-A090 923.

Scanning Electron Microscope (SEM) Applications were developed and demonstrated for determining circuit configuration and organization. These applications employ voltage contrast and Electron Beam Induced Current (EBIC) techniques. Procedures were developed utilizing these applications to evaluate semiconductor memory circuits. These procedures provide practical methods for developing die maps, electrical circuit schematics, logic diagrams, device block diagrams and memory array bit maps. The SEM data are used in conjunction with light microscopy data to provide significant improvements in device characterization. (Author)

AD-A090 923/4 PC **A10**/MF **A01**
Martin Marietta Corp Denver CO Failure Analysis Lab
SEM Analysis Techniques for LSI Microcircuits. Volume II.
Final technical rept. 8 Sep 78-8 Feb 80,
J. R. Beall, W. E. Echols, and D. D. Wilson. Aug 80, 207p MCR-80-508-VOL-2, RADC-TR-80-250-VOL-2
Contract F30602-78-C-0354
See also Volume 1, AD-A090 922.

Scanning Electron Microscope (SEM) Applications were developed and demonstrated for determining

circuit configuration and organization. These applications employ voltage contrast and Electron Bean Induced Current (EBIC) techniques. Procedures were developed utilizing these applications to evaluate semiconductor memory circuits. These procedures provide practical methods for developing die maps, electrical circuit schematics, logic diagrams, device block diagrams and memory array bit maps. The SEM data are used in conjunction with light microscopy data to provide significant improvements in device characterization.

AD-A090 969/7 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Cambridge.
Electrically Pumped Relativistic Free-Electron Wave Generators,
G. Bekefi. 26 Oct 79, 10p AFOSR-TR-80-0977
Grants AFOSR-77-3143, NSF-ENG79-07047
Pub. in Jnl. of Applied Physics, v51 n6 p3081-3089 Jun 80.

No abstract available.

AD-A090 979/6 PC **A02**/MF **A01**
Foreign Technology Div., Wright-Patterson AFB, OH.
One Device for Coherent Reception of Wide-Band Orthogonal Signals,
V. N. Zuev, A. N. Ioshchenko, Ye. F. Kvashnin, and V. L. Savinykh. 6 Apr 79, 12p Rept no. FTD-ID(RS)T-0510-79
Edited trans. of Trudy Uchebnykh Inst. Svyazi (USSR) Issue 53 p15-20 1971, by Martin J. Folan.

No abstract available.

AD-A090 985/3 PC **A02**/MF **A01**
Foreign Technology Div., Wright-Patterson AFB, OH.
Device Which Triggers High-Volt Pulse Generator,
I. P. Pekar. 11 Feb 80, 9p Rept no. FTD-ID(RS)T-1934-79
Edited trans. of Patent (USSR) 341 150 p1-2, 5 Jun 72, by Marilyn Olaechea.

No abstract available.

AD-A091 002/6 Not available NTIS
Carnegie-Mellon Univ., Pittsburgh, PA. Dept. of Mathematics.
Bounds for the rth Characteristic Frequency of a Beaded String or of an Electrical Filter,
Michael F. Barnsley, and Richard J. Duffin. 3 Mar 80, 6p ARO-16785.1-M
Contract DAAG29-80-C-0037
Prepared in cooperation with Georgia Inst. of Tech., Atlanta. School of Mathematics.
Availability: Pub. in Proceedings of the National Academy of Sciences, v77 n6 p3120-3124 Jun 80 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A091 112/3 PC **A02**/MF **A01**
Rome Air Development Center, Griffiss AFB, NY.
Study of the Potential of Main-Beam Nulling with an Overlapped-Subarray Antenna,
Ronald L. Fante. Mar 80, 23p Rept no. RADC-TR-80-117

A study has been made of the possibility of placing nulls in the main beam of an overlapped subarray antenna by controlling the subarray pattern. We have found that it is possible to form main-beam nulls by this technique, but that the nulls are relatively narrow band. (Author)

AD-A091 283/2 PC **A03**/MF **A01**
Army Electronics Research and Development Command, Fort Monmouth, NJ. Electronics Technology and Devices Lab.
The Electron Beam Semiconductor (EBS) Amplifier.
Research and development technical rept.,
Robert M. True, and James F. Baxendale. Jul 80, 42p Rept no. DELET-TR-80-13

The Electron Beam Semiconductor (EBS) concept has existed for three decades; but only within the last decade has an active, well-defined program been underway to develop devices that can operate as high-power radio frequency(RF) amplifiers, fast risetime switches, and current and voltage pulse amplifiers. This report discusses the test procedures, data and results of reliability testing of RF and video pulse EBS amplifiers at Electronics Research and Development Command (ERADCOM), Fort Monmouth, New Jersey. Also, the experimental analysis of the series-connected diode EBS device is described in detail. Finally, the report concludes with a discussion of the state-of-the-art of EBS and future trends of the technology. (Author)

AD-A091 352/5 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Data Traffic Performance of an Integrated Circuit- and Packet-Switched Multiplex Structure.
Journal article,
Clifford J. Weinstein, Marilyn L. Malpass, and Michael J. Fisher. 12 Mar 79, 7p JA-4955, ESD-TR-80-185
Contract F19628-80-C-0002
Pub. in IEEE Transactions on Communications, vCOM-28 n6 p873-878 Jun 80.

No abstract available.

AD-B012 981/7 PC **A04**/MF **A01**
Martin Marietta Aerospace, Denver, CO. Denver Div.
Evaluation of Adhesives for Hybrid Microcircuits.
Final technical rept.,
R. A. Homan. Jun 76, 74p MCR-75-394, RADC-TR-76-174, GIDEP-E059-0736
Contract F30602-73-C-0149
Update of Rept. no. MCR-74-139 dated 1973.
Distribution limitation now removed.

An evaluation of the use of adhesives in microcircuits was performed. Ten adhesives were subjected to physical properties analyses including TGA-RGA testing. Four of these adhesives having significant industry use were further used in the fabrication of hybrid test circuits. The circuits utilized a power transistor and a MOSFET transistor for evaluation of thermal/electrical and contamination/outgassing effects. Control samples using only eutectic bonds were also fabricated. High temperature storage, power burn-in, power cycling, thermal shock, mechanical shock, cetrifuge, and seal tests were performed. No adverse results in the areas of mechanical bond strength, surface contamination effects on the MOSFETs, or contamination effects on hybrid assembly processes were identified from the use of these adhesives for ship bonding. Electrical and thermal conductivities were decreased as compared to eutectic bonds. The evaluation indicated that the adhesives tested are viable candidates for use as chip attach in high reliability applications.

AD-B012 994/0 PC **A12**/MF **A01**
Epsco Labs Wilton Conn
Microfiche Scanner and Remote Display System.
Final technical rept. 1 Jul-30 Dec 75,
Robert A. Botticelli, Donald J. Walker, and Gerald N. Wallmark. May 76, 274p RADC-TR-76-150
Contract F30602-75-C-0328
Presented at Conference of Society for Information Display, 5 May 76, Los Angeles, Calif.
Distribution limitation now removed.

This report presents the final results of a study to define an information transfer system between a microfiche storage center and a number of remote users. The scope of the program included a parametric/cost study and alternate system and component analysis which resulted in the definition and recommendation of an optimized 'Microfiche Scanner and Remote Display System'. (Author)

BDX-613-2489 PC **A03**/MF **A01**
Bendix Corp., Kansas City, MO.
Comparison of Metallization Systems for Thin Film Hybrid Microcircuits.
R. A. Hines, and M. K. Raut. Aug 80, 44p
Contract AC04-76DP00613

Five metallization systems were evaluated for fabricating thin film hybrid microcircuits. The titanium/palladium/electroplated gold system proved superior in terms of thermocompression bondability, corrosion resistance, and solderability. (ERA citation 05:036934)

N81-10093/5 PC **A03**/MF **A01**
Telefonaktiebolaget L. M. Ericsson, Moelndal (Sweden). MI Div.
Ericsson Antennas in Space.
L. G. Josefsson. 15 Feb 80, 37p MI-A-0021

Examples of satellite antennas now orbiting the Earth in operational satellites, and antennas still in development are described. Some results from studies for future advanced systems are presented. The described antenna systems include those of ISEE-B, EXOSAT, ISPM and GEOS satellites.

N81-10238/6 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Huntsville, AL. George C. Marshall Space Flight Center.
Pilot Signals for Large Active Retro-Directive Arrays.
C. H. Chan. Aug 80, 19p NASA-TM-78310

It has been suggested that for large active retrodirective arrays, as in the solar power system, a two tone uplink pilot signal with frequencies symmetrically situated around the downlink frequency be used in order to reduce ionospheric biases and to lower the cost since a two tone receiver is economically much cheaper than a single tone phase locked receiver. Such a system now faces two difficulties: the Pi-ambiguity; and a large phase difference between the downlink and uplink signals. The Pi-ambiguity is shown to be easily removed by using a two tone uplink signal with both frequencies situated at one side of the downlink frequency, and the phase difference can be greatly reduced with a three tone or a four tone uplink pilot signal.

N81-10253/5 PC **A02**/MF **A01**
Telefonaktiebolaget L. M. Ericsson, Moelndal (Sweden). MI Div.
Broadband Microstrip Array Antenna.
I. Karlsson. 21 Mar 80, 5p MI-A-0112

A broadband (13 percent) microstrip array antenna with high efficiency, low cost and low weight was designed and evaluated. The antenna is foam supported and is 0.15 lambda thick. The feeding is accomplished by a separate microstrip network. This antenna is compared with two dielectric loaded microstrip antennas, one with a separate stripline feed network and one with an integrated microstrip network. The foam supported antenna gave lower costs and better electrical performance.

N81-10254/3 PC **A02**/MF **A01**
Telefonaktiebolaget L. M. Ericsson, Moelndal (Sweden).
International Solar Polar Mission Satellite High Gain Antenna (ISPM HGA) Conical Scan Signal: A Study Note.
M. Bonnedal. 20 Dec 79, 18p MI-A-9361

The conical scan signal was calculated for a perfect reflector and for different tilt angles. The influence of a distorted reflector was also studied. The measured radiation pattern from a coaxial feed at 2.111 GHz was utilized. The results are presented in graphs.

N81-10255/0 PC **A02**/MF **A01**
Telefonaktiebolaget L. M. Ericsson, Moelndal (Sweden). MI Div.
Polarization Characteristics in Terms of the Complex Polarization Factor p.
L. G. Josefsson. 29 Jan 76, 10p MI-KD-6051

An alternative expression to Beckman's description of the polarization efficiency of a receiving antenna is derived, by means of a systematic definition of coordinate systems. The meaning of orthogonal polarization and cross polarization becomes clear and suitable expressions are more readily obtained.

N81-10257/6 PC **A02**/MF **A01**
Royal Radar Establishment, Malvern (England).
Some Observations on the Significance of Orthogonal Modes in Antenna Analysis by the Method of Moments.
T. E. Hodgetts. Nov 79, 17p RSRE-3238, BR72753

The so-called orthogonal modes which appear in the context of boundary-value problems in electromagnetic field theory are examined. It is proven that any problem describable in terms of a linear operator equation with a symmetric matrix representation of the operator possesses a set of characteristic orthogonal modes, such that when the problem is re-formulated in terms of the characteristic modes the matrix of the operator becomes diagonal. The value of this fact is discussed, and some practical methods of performing the diagonalizing reformulation are described and compared.

N81-10305/3 PC **A04**/MF**A01**E
Siemens A.G., Munich (Germany, F.R.). Unternehmensbereich Bauelemente.
An Optoelectronic Detector with Linear Gain for Light Measurements and Optical Communication.
Final Report.
W. Spaeth, W. Soellner, and G. Waitl. Dec 79, 64p BMFT-FB-T-79-86
In German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

Darlington amplifiers employing a current divider in a feedback circuit consisting of a combination of lateral and vertical transistors were developed. The realization of detector circuits with integrated amplifiers of this type is described. The cut-off frequency observed for units having a gain of about 200 was typically 7 MHz. Excellent gain linearity down to the pA-level makes these photodetectors particularly suitable for low level light detection.

N81-10307/9 PC **A04**/MF **A01**
Laboratoires d'Electronique et de Physique Appliquee, Limeil-Brevannes (France).
GaAs Integrated Circuit Materials and Technologies. Part 1: Study and Realization of Implanted Epitaxial Layers Etude de Materiaux et de Technologies pour Circuits Integres a l'GaAs. Premier Lot: Etude et Elaboration de Couches Epitaxiales n(-1) Implantees.
Final Report.
C. Hurtes. Jan 80, 54p LEP-80/035.SME-441-K-PT-1
Contract DGRST-78-7-2094
Text in French.

Epitaxial n(-) layers for ionic implantation were prepared by the classical arsenic trichloride method using Ga and GaAs sources. Depositing temperatures in the 760 to 640 C range were employed. The O2 and Cr doping techniques adopted are described together with the different methods utilized to characterize defects: photoluminescence, DLTS and Hall measurements. Small dose Se(-) ion implantation was carried out at 280 KeV on both n layers and bulk semiconductor material. It was followed by classical annealing. Significant results are reported.

RL-79-087 PC **A02**/MF **A01**
Science Research Council, Chilton (England). Rutherford and Appleton Labs.
New Photocathode for X-Ray Image Intensifiers Operating in the 1-50 KeV Region.
J. E. Bateman, and R. J. Apsimon. Nov 79, 15p
U.S. Sales Only.

Preliminary results are presented indicating the potential of low density CsI cathodes for x-ray imaging. The low stopping power of the layers (approximately 10mg/cm exp 2) means that the most attractive applications lie in the soft x-ray region (< approximately 10 keV) where the high number of secondaries available (> 10/keV) also ensures good detection efficiency. In a 'windowless' form the cathode should perform well down to low quantum energies (< approximately 10 eV). The ability of the cathode to withstand exposure to the atmospheric ambient leads to great operational flexibility. In the x-ray energy region above 10 keV the basic 4% dense cathode, while preserving good spatial resolution, has poor quantum efficiency. (Atomindex citation 11:514448)

SAND-80-1793C PC **A02**/MF **A01**
BDM Corp., Albuquerque, NM.
Characterization of Sandia Laboratories Expanded Linear Array Silicon Gate CMOS Standard Cells.
R. J. Antinone, D. R. Alexander, and G. W. Brown. 1980, 20p CONF-801108-3
Contract AC04-76DP00789
Government microcircuit applications conference, Houston, TX, USA, 19 Nov 1980.

Sandia National Laboratories has developed a family of standard cells based on radiation hardened silicon gate CMOS devices using 4 mu m channel lengths. Because of their arrangement in regular linear patterns, the cells are referred to as expanded linear array (ELA) cells. Other papers submitted to this conference describe the design features of this cell family. This paper describes a systematic approach to the prediction of ELA cell operational characteristics. These characteristics include risetime, faltime, propagation delay, and maximum operating frequency as a function of load capacitance, transistor performance, and supply voltage. Data for these predictions are derived from device and process measurements and from geometrical data taken from mask plots. (ERA citation 05:037114)

10. ENERGY CONVERSION (NON-PROPULSIVE)

10A. Conversion Techniques

AD-A091 085/1 PC **A06**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Experimental Study of the Thermal Performance Parameters of a Liquid-heating Flat Plate Solar Collector.
Master's thesis,
Charles Dana Woodrum. Sep 80, 122p Rept no. AFIT/GAE/AA/80S-3

From the results of this investigaiton the following conclusions are drawn: (1) The use of turbulators greatly enhanced the internal heat transfer coefficient, but unfortunately, made little difference in the overall performance; (2) The use of turbulators improved flow uniformity by increasing the pressure drop in the tubes; (3) The diameter of the headers should be larger to help ensure flow uniformity. This is especially true for low flowrate conditions such as those tested; (4) The bond conductance for the clamped fin was competitive with soldering since little gain in performance is realized after a value of 20 B/hr-ft-F is achieved; (5) The bond conductance of the woven fin configuration was unacceptable; and (6) Kalwall material was essentially opaque to far infrared radiation.

ALO-4121-2 PC **A06**/MF **A01**
Acurex Corp., Mountain View, CA. Alternate Energy Div.
Development of a Low-Cost Solar Panel Using Laminated Polymer Films. Final Report, September 15, 1977-November 15, 1978.
E. V. Nelson, G. J. Adams, W. Elkins, and A. H. McLeod. Mar 80, 116p
Contract EG-77-C-04-4121

The objective of this program is to demonstrate the fabrication of an inexpensive single-glazed flat plate collector which is fabricated with thin polymer films in high speed production processes. Progress is reported on the following tasks: design analysis, materials selection, panel manufacturing, thermal performance testing, and applications and cost analysis. (ERA citation 05:036483)

ANL/CNSV-TM-41 PC **A03**/MF **A01**
Argonne National Lab., IL.
Summary of Current State Industrial Energy Conservation Programs.
R. W. Anderson, A. R. Evans, and P. J. Grogan. May 80, 35p
Contract W-31-109-ENG-38

A preliminary study of industrial energy conservation measures initiated by states under the State Energy Conservation Program is presented. Elements, targets, and administration of state programs are briefly examined. As the results of the study indicate, the states perceive the need for Federal assistance in programs to: establish a forum for coordination of state programs and interchange of approaches and program materials; provide to state offices direct technical assistance, including specific program information, training materials and manuals directed toward specific industries, and an energy accounting methodology; promote national industrial energy conservation measures; develop methods for providing financial assistance to companies, especially small business, for incorporating energy conserving measures; devise a plan for coordinating the state energy-related regulatory activities; and disseminate information on Federal programs and regulations that may impact energy-related decisions at the state level and within private industry. (ERA citation 05:035090)

ANL-80-80 PC **A05**/MF **A01**
Argonne National Lab., IL.
Argonne Solar Energy Program Annual Report. Summary of Solar Program Activities for Fiscal Year 1979.
Jun 80, 83p
Contract W-31-109-ENG-38

The R and D work done at Argonne National Laboratory on solar energy technologies during the period October 1, 1978 to September 30, 1979 is described. Technical areas included in the ANL solar program are solar energy collection, heating and cooling, thermal energy storage, ocean thermal energy conversion, photovoltaics, biomass conversion, satellite power systems, and solar liquid-metal MHD power systems. (ERA citation 05:036210)

BNL-28154 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Experiment in Multiple-Criteria Energy Policy Analysis.
J. K. Ho. Jul 80, 18p CONF-800847-1
Contract AC02-76CH00016
International conference on multiple criteria decision making, Newark, DE, USA, 11 Aug 1980.

An international panel of energy analysts participated in an experiment to use HOPE (holistic preference evaluation): an interactive parametric linear-programming method for multiple-criteria optimization. The criteria of cost, environmental effect, crude oil, and nuclear fuel were considered according to BESOM: an energy model for the US in the year 2000. (ERA citation 05:035045)

BNL-50923 PC **A04**/MF **A01**
Brookhaven National Lab., Upton, NY.
Comparative Assessment of Energy-Economy Interactions.
R. J. Goettle, IV, E. A. Hudson, and J. Lukachinski. Dec 78, 62p
Contract AC02-76CH00016

This analysis is concerned with the impact of energy-policy measures on the level, growth, and structure of the US economy. In particular, the nature and magnitude of the causal relationship between variations in the prices of various energy forms and economic performance, as measured by real gross national product (GNP), is studied. The combined Brookhaven National Laboratory/ Dale W. Jorgenson Associates (BNL/DHA) energy-economy model system is used to determine the economic effects of three energy-price futures combined with an invariant set of energy policies. The price alternatives are intended to characterize the uncertainty that exists in the policy-planning environment. In addition, the results are compared to those obtained from another DOE-sponsored analysis which used the Data Resources, Incorporated (DRI) quarterly macroecon-

omic model to assess the effects of these same three cases. Significant numerical differences in the results from these modeling systems are observed and are attributed to structural differences between the two methodologies. The methodological issues emerging from this comparison have important policy implications which are independent of the specific numerical conclusions. Since it is uncertain which, if either, of the models is correct, the use of one for policy analysis entails the risk that policy will be predicated on inaccurate information. This risk is analyzed within an explicit framework and clear decision rules for information selection and the choice between the modeling systems are formulated. (ERA citation 05:036719)

BNL-51105 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Strategic Cost-Benefit Analysis of Energy Policies: Overview.
H. Davitian, P. J. Groncki, P. Kleeman, J. Lukachinski, and R. J. Goettle, IV. Oct 79, 24p
Contract AC02-76CH00016

This study describes three possible energy strategies and analyzes each in terms of its economic, environmental, and national security benefits and costs. Each strategy is represented by a specific policy. In the first, no additional programs or policies are initiated beyond those currently in effect or announced. The second is directed toward reducing the growth in energy demand, i.e., energy conservation. The third promotes increased domestic supply through accelerated development of synthetic and unconventional fuels. The analysis focuses on the evaluation and comparison of these strategy alternatives with respect to their energy, economic, and environmental consequences. The results indicate that conservation can substantially reduce import dependence and slow the growth of energy demand, with only a small macroeconomic cost and with substantial environmental benefits; the synfuels policy reduces imports by a smaller amount, does not reduce the growth in energy demand, involves substantial environmental costs and slows the rate of economic growth. These relationships could be different if the energy savings per unit cost for conservation are less than anticipated, or if the costs of synthetic fuels can be significantly lowered. Given these uncertainties, both conservation and RD and D support for synfuels should be included in future energy policy. However, between these policy alternatives, conservation appears to be the preferred strategy. The results of this study are presented in three reports (see also BNL--51127 and BNL--51128). (ERA citation 05:036746)

BNL-51127 PC **A04**/MF **A01**
Brookhaven National Lab., Upton, NY.
Strategic Cost-Benefit Analysis of Energy Policies: Detailed Projections.
H. Davitian, P. J. Groncki, P. Kleeman, and J. Lukachinski. Oct 79, 75p
Contract AC02-76CH00016

Current US energy policy includes many programs directed toward restructuring the energy system in order to decrease US dependence on foreign supplies and to increase our reliance on plentiful and environmentally benign energy forms. However, recent events have led to renewed concern over the direction of current energy policy. This study describes three possible energy strategies and analyzes each in terms of its economic, environmental, and national security benefits and costs. Each strategy is represented by a specific policy. In the first, no additional programs or policies are initiated beyond those currently in effect or announced. The second is directed toward reducing the growth in energy demand, i.e., energy conservation. The third promotes increased domestic supply through accelerated development of synthetic and unconventional fuels. The analysis focuses on the evaluation and comparison of these strategy alternatives with respect to their energy, economic, and environmental consequences. Results indicate that conservation can substantially reduce import dependence and slow the growth of energy demand, with only a small macroeconomic cost and with substantial environmental benefits; the synfuels policy reduces imports by a smaller amount, does not reduce the growth in energy demand, involves substantial environmental costs and slows the rate of economic growth. These relationships could be different if the energy savings per unit cost for conservation are less than anticipated, or if the costs of synthetic fuels can be significantly lowered. Given these uncertainties, both conservation and RD and D support for synfuels should be included in future energy policy. However, between these policy alternatives, conservation appears to be the preferred strategy. The results of this study are presented in three reports (see also BNL--51105 and BNL--51128). 11 references, 3 figures, 61 tables. (ERA citation 05:036747)

CONF-790890- PC **A12**/MF **A01**
Alabama Univ. in Huntsville. Kenneth E. Johnson Environmental and Energy Center.
Final Proceedings of the Solar Export Issues Workshop.
Oct 79, 255p
Contract EG-77-S-05-5362
Solar export issues workshop, Bethesda, MD, USA, 12 Aug 1979.

Twenty four papers and the Domestic Policy Review of Solar Energy were abstracted. Also included in the proceedings are lists of issues and recommendations. (ERA citation 05:036215)

CONF-791251- PC **A12**/MF **A01**
Indian Inst. of Management, Ahmedabad.
Research Planning Workshop on Energy for Rural Development.
1979, 258p
Research planning workshop on energy for rural development, Ahmedabad, India, 27 Dec 1979.
U.S. Sales Only.

The Research Planning Workshop was conducted to develop an integrated need-based research and implementation program consisting of projects for energy supply in rural areas of India, with emphasis on renewable sources, which can be implemented in 2 to 3 years. Many papers were presented in the following sessions: Rural Energy Demand Supply Data Base Development (3 papers); Introduction to New and Renewable Energy Technologies in Rural Energy Mix I (solar technology and integrated rural energy centers, (4 papers); Introduction to New and Renewable Energy Technologies in Rural Energy Mix II (biogas plants, 5 papers); Fuel Plantation for Rural Areas (3 papers); Techno-Economic Analysis of Rural Energy Systems (2 papers); and Energy Policy for Rural Areas and Development Strategy. (ERA citation 05:036777)

CONF-800383- PC **A06**/MF **A01**
Department of Energy, Washington, DC. Office of Energy Research.
DOD-DOE Workshop on Joint Energy Activities.
1980, 113p
DOD-DOE workshop on joint energy activities, Gaithersburg, MD, USA, 10 Mar 1980.

The general conditions for DOD-DOE interactions were delineated in an October 1978, Memorandum of Understanding (MOU) that identified two basic goals: improving energy efficiency and availability within DOD, and utilizing DOD and DOE expertise and facilities to carry out projects of mutual interest. There has been considerable interaction between DOD and DOE, including a number of proposed joint initiatives but a systematic and coordinated approach for nurturing, maintaining, and expanding these relationships has not been developed. A DOD-DOE Workshop on Joint Energy Activities was held on March 10-12, 1980. The workshop was structured into five working groups - Mobility Fuels, Conservation, Fossil Fuels for Fixed Facilities, Solar and Renewable Energy Sources, and Special Projects - with DOD and DOE cochairmen for each. Over a hundred DOD and DOE management, program, and policymaking representatives were brought together by the workshop Steering Committee to identify specific programs for inclusion in an overall plan for implementing the MOU and to deal with fundamental issues and problems of maintaining future communications. The workshop accomplished its goals, these being to: (1) improve communication among the appropriate key DOD and DOE personnel at all levels and promote information exchange; (2) review ongoing and already-proposed joint DOD and DOE programs; (3) initiate a coordinated, systematic effort to establish joint DOD-DOE energy-security programs; and (4) propose specific programs and projects of mutual interest for inclusion in a follow-on joint-implementation plan. (ERA citation 05:035044)

COO-1340-73 PC **A05**/MF **A01**
Colorado State Univ., Fort Collins. Dept. of Atmospheric Science.
Energy-Consumption Modelling.
E. R. Reiter. 1980, 81p CONF-8004113-1
Contract AS02-76EV01340
NOAA the economic impact of climate conference, Columbia, MO, USA, 11 Apr 1980.

A highly sophisticated and accurate approach is described to compute on an hourly or daily basis the energy consumption for space heating by individual buildings, urban sectors, and whole cities. The need for models and specifically weather-sensitive models, composite models, and space-heating models are discussed. Development of the Colorado State University Model, based on heat-transfer equations and on a heuristic, adaptive, self-organizing computation learning approach, is described. Results of modeling energy consumption by the city of Minneapolis and Cheyenne are given. Some data on energy consumption in individual buildings are included. (ERA citation 05:036810)

COO-4297-3 PC **A04**/MF **A01**
EIC, Inc., Newton, MA.
Corrosion Protection of Solar-Colictor Heat Exchangers with Electrochemically Deposited Films. Final Report, 15 May 1978-15 November 1979.
V. R. Koch, G. H. Schnaper, and S. B. Brummer. May 80, 67p
Contract AC04-78CS34297

The goal of this program was the demonstration of a novel corrosion protection technique for the common solar collector metals: Al, Cu, and Fe as mild steel. This involves the electrochemical deposition of thin, adherent polymer films on the interior of heat-exchanger tubes by application of a current in the presence of a suitable organic monomer. Polyphenylene oxide (PPO) films were anodically deposited onto Cu and Fe coupons from methanolic media. However, defects in these films afforded poor corrosion protection. In an attempt to circumvent this problem, suitably functionalized PPO films were cross-linked via Schiff base formation in a subsequent chemical step. While these chemically modified PPO films were demonstrably more resistant to ethylene glycol H sub 2 O media at elevated temperatures, they were eventually undetermined by the thermal transfer fluid. Cinnamaldehyde, a styrene-type monomre, has been successfully electrodeposited onto Al coupons. This process involved a constant, albeit unreferenced potential technique in which the Al is made the negative electrode. Cathodic deposition onto Al avoids passivating Al sub 2 O sub 3 barrier coating formation, and is amenable to the cross-linking technique. Filmed and cross-linked Al samples stored at elevated temperatures resisted corrosive processes compared to unfilmed control samples. Pitting, however, was the ultimate fate of all filmed samples. (ERA citation 05:036484)

DOE/CS/10045-T1 PC **A15**/MF **A01**
Natural Resources Defense Council, Inc., San Francisco, CA.
Choosing an Electrical Energy Future for the Pacific Northwest: An Alternative Scenario.
R. C. Cavanagh, L. Mott, J. R. Beers, and T. L. Lash. Aug 80, 328p
Contract FG03-79CS10045

An Alternative Scenario for the electric energy future of the Pacific Northwest is presented. The Scenario includes an analysis of each major end use of electricity in the residential, commercial, manufacturing, and agricultural sectors. This approach affords the most direct means of projecting the likely long-term growth in consumption and the opportunities for increasing the efficiency with which electricity is used in each instance. The total demand for electricity by these end uses then provides a basis for determining whether additional central station generation is required to 1995. A projection of total demand for electricity depends on the combination of many independent variables and assumptions. Thus, the approach is a resilient one; no single assumption or set of linked assump-

tions dominates the analysis. End-use analysis allows policymakers to visualize the benefits of alternative programs, and to make comparison with the findings of other studies. It differs from the traditional load forecasts for the Pacific Northwest, which until recently were based largely on straightforward extrapolations of historical trends in the growth of electrical demand. The Scenario addresses the supply potential of alternative energy sources. Data are compiled for 1975, 1985, and 1995 in each end-use sector. (ERA citation 05:035046)

DOE/CS/10046-1(Rev.) PC **A07**/MF **A01**
Colorado School of Mines Research Foundation, Inc., Golden.
Inventory of State Energy Models.
A. G. Melcher, R. L. Gist, R. G. Underwood, and J. C. Weber. 31 Mar 80, 128p
Contract AC02-79CS10046

These models address a variety of purposes, such as supply or demand of energy or of certain types of energy, emergency management of energy, conservation in end uses of energy, and economic factors. Fifty-one models are briefly described as to: purpose; energy system; applications;status; validation; outputs by sector, energy type, economic and physical units, geographic area, and time frame; structure and modeling techniques; submodels; working assumptions; inputs; data sources; related models; costs; references; and contacts. Discussions in the report include: project purposes and methods of research, state energy modeling in general, model types and terminology, and Federal legislation to which state modeling is relevant. Also, a state-by-state listing of modeling efforts is provided and other model inventories are identified. The report includes a brief encylopedia of terms used in energy models. It is assumed that many readers of the report will not be experienced in the technical aspects of modeling. The project was accomplished by telephone conversations and document review by a team from the Colorado School of Mines Research Institute and the faculty of the Colorado School of Mines. A Technical Committee (listed in the report) provided advice during the course of the project. (ERA citation 05:036715)

DOE/CS/20095-01 PC **A05**/MF **A01**
Resource Planning Associates, Inc., Washington, DC.
Third Program Plan for DOE'S Participation in the IEA Working Party on Energy-Conservation Research and Development.
Jun 80, 78p
Contract AC01-79CS20095

The Plan documents the projects currently being conducted by the working party in which DOE is participating and the projects proposed by DOE for consideration by other IEA member nations. Chapter 1 reviews current and planned DOE commitments to existing implementing agreements: buildings and community systems; energy conservation in building complexes; energy cascading; heat pumps with thermal storage; advanced heat pumps; combustion; heat transfer and heat exchangers; energy storage; cement manufacturer; and high-temperature materials for automotive propulsion systems. Chapter 2 reviews planned DOE commitments to new implementing agreements: combustion; pulp and paper; iron and steel; food processing; urban waste; and alcohol additives to fuel. Appendix A discusses the mechanisms for establishing implementing agreements and annexes. Appendix B lists working party members and Appendix C describes the evaluation methodology. (ERA citation 05:036734)

DOE/CS/20160-01 PC **A06**/MF **A01**
Northrop Services, Inc., Huntsville, AL.
Site Insolation and Wind Power Characteristics, Technical Report Northeast Region. Vol. 2.
Aug 80, 104p
Contract AC01-77ET-20160

This phase of the Site Insolation and Wind Power Characteristics Study was performed to provide statistical information on the expected future availability of solar and wind power at various sites in the Northeast Region of the US Historic data (SOLMET), at 8 National Weather Service stations with hourly solar insolation and collateral meteorological information, were interrogated to provide an estimate of future trends. Solar data are global radiation incident on a horizontal surface, and wind data represent wind power normal to the air flow. Selected insolation and wind power conditions were investigated for their occurrence and persistence, for defined periods of time, on a monthly basis. Global horizontal insolation are related to inclined surfaces at each site. Ratios are provided, monthly, for multiplying global insolation to obtain insolation estimates on south-facing surfaces inclined at different angles with respect to the horizontal. (ERA citation 05:036597)

DOE/CS/20189-1 PC **A07**/MF **A01**
General Electric Co., Washington, DC.
Energy Use in Office Buildings. Volume 1. Analysis of 1977 Office Building Energy Use as Reported in the Building Owners and Managers Association Data Base.
29 Aug 80, 136p

This report presents the results of Task IA of the Energy Use in Office Buildings Project: an analysis in tabular form of the 1977 office building energy use data base of the Building Owners and Managers Association (BOMA). BOMA's approximately 4000 members directly manage over 500 million ft exp 2 of commercial office space, which is approximately 16% of total commercial office building space. BOMA annually collects data on office building characteristics and operating performance for presentation in its Experience Exchange Report. Data are collected from BOMA member and non-member buildings electing to participate in the reporting process; and, in addition, a number of Federal, state, and local government buildings have been participating since 1977. Summaries of the data are published by BOMA on an aggregate basis; the summaries, which are developed on a city or regional basis, provide a benchmark for use by building managers in comparing the results of specific building operations with the industry's aggregate experience. Access to the 1977 BOMA data base was obtained under a subcontract with BOMA. Data for 1342 buildings - 1059 commercial office buildings and 283 government office buildings in the United States and Canada - were delivered. Of the 1059 commercial office buildings, 999 were located in the US. A total of 233 Federal-, state-, and local-government-operated buildings located in the US were also in the data base. Energy use data were reported by BOMA in terms of kWh of electricity, ft exp 3 of gas, gal of oil, and lb of steam. The data were converted to BTU's, and all building energy measures were expressed in terms of Btu/ft exp 2 . Section II presents analysis for commercial office buildings; and Section III presents the analysis for government office buildings. (ERA citation 05:035080)

DOE/CS/20413-01 PC **A09**/MF **A01**
DCS Corp., Arlington, VA.
Status of Thermal Imaging Technology as Applied to Conservation-Update 1.
F. J. Snow, J. T. Wood, and R. C. Barthle. Jul 80, 200p
Contract AC01-78CS20413

This document updates the 1978 report on the status of thermal imaging technology as applied to energy conservation in buildings. Thermal imaging technology is discussed in terms of airborne surveys, ground survey programs, and application needs such as standards development and lower cost equipment. Information on the various thermal imaging devices was obtained from manufacturer's standard product literature. Listings are provided of infrared projects of the DOE building diagnostics program, of aerial thermographic firms, and of aerial survey programs. (ERA citation 05:036812)

DOE/CS/30292-3 PC **A02**/MF **A01**
Wisconsin Center for Public Policy, Madison.
SOLPLAN.
8 Aug 80, 13p
Contract FG02-79CS30292

Recommendations developed at the Financing Residential Conservation Conference II are presented. Reactions were sought from the participants on the following: financial institution initiatives; utility initiatives; and state initiatives. A questionnaire lists a number of suggested alternatives for increasing energy conservation and the use of alternatives forms of energy within Wisconsin. Twenty-six suggestions are given. (ERA citation 05:036862)

DOE/CS/32241-1 PC **A10**/MF **A01**
FAFCO, Inc., Menlo Park, CA.
Coaxial Extrusion Conversion Concept for Polymeric Flat Plate Solar Collectors. Final Technical Report, September 30, 1978-December 31, 1979.
R. O. Rhodes, N. J. Chapman, K. C. Chao, and K. F. Sorenson. Jan 80, 221p
Contract AC03-78CS32241

This study investigated materials and processes for fundamental improvements in flat-plate solar collector cost and performance. The goal was to develop a process for direct conversion of inexpensive raw materials into a completed solar collector unit, without labor intensive assembly operations. It was thought that materials carefully matched to the process and end-use environment would substantially reduce collector costs, as compared to conventional industry practice. The project studied the feasibility of a cost-effective, glazed solar collector, with low labor input, utilizing a coaxial extrusion of compatible polymeric materials. This study evaluated all considered materials for the desired application. In addition, there was a trial extrusion of the leading candidate glazing and absorber materials, which resulted in successfully performing a coaxial extrusion of one cell. At the time the study was conducted, there were no materials available that met the necessary requirements for the specified utilization. It was recommended that, if potentially compatible materials become available, further investigation into the suitability of those materials be researched. Then, if a suitable material was found, proceeding into Phase II would be recommended. (ERA citation 05:036485)

DOE/CS/35302-T1 PC **A03**/MF **A01**
Pennsylvania State Univ., University Park. Materials Research Lab.
Black Germanium Selective Absorber Surfaces. Final Technical Report, September 1, 1978-June 30, 1979.
R. Messier, K. Vedam, and S. V. Krishnaswamy. Dec 79, 38p
Contract AC04-78CS35302

Semiconductor films with an appropriate band gap (approx. 0.5 to 1.25 ev) have a high absorption coefficient in the solar spectrum region and high transmission in the IR thermal-emission region and thus make nearly ideal selective absorbers. However, due to their high refractive index, semiconductor films have high reflectance above their absorption edge which limits their total absorption. A coating which would retain the advantages of the semiconductor's selectivity and also reduce the reflectance from the present values of 30 to 50% to a level of less than 2% would be a significant advancement in the state of the art. This study describes work on the preparation and characterization of structurally anisotropic black Ge films by rf-sputtering and postdeposition etching. It has been shown that by controlling the sputtering preparation conditions of noncrystalline Ge films the surface microstructure can be drastically altered by simply etching in 30% H sub 2 O sub 2 . The total reflectance of the resulting surface was reduced from about 45% to less than 1%. Furthermore, the films appear black over a wide range of angles of incidence (up to 45% from the normal). This flat black appearance is shown to be due to a dense array of aligned, needle-like protrusions which have an extremely high aspect ratio and both a cross-sectional area and a separation between the needles on th order of the wavelength of solar radiation. Black Ge films were obtained with a solar absorptance, alpha /sub S/, of greater than 0.99 in the best cases. Variation of alpha /sub S/ and epsilon/sub IR/ (IR emittance) with the thickness of the film and other preparation conditions is described. Further, the various microstructures are classified and understood on the basis of a structure zone model. (ERA citation 05:036486)

DOE/CS/40150-1 PC **A05**/MF **A01**
Thermo Electron Corp., Waltham, MA.

Impact on Energy Conservation of Automatic Control Systems Utilization in the US Pulp and Paper Industry.
S. S. Fam. 1978, 87p
Contract AC02-78CS40150

This study is concerned with the energy and other resource benefits resulting from the computerized automation of processes in the US pulp and paper industry. The primary objectives were to characterize the state of the art of computer controls in the industry and to pinpoint the problem areas that limit their further use. The study lasted approximately 4 months. An exhaustive survey of all the possible technologies in use, or under development, was not possible. The main conclusions are that the pulping and recovery operations offer the greatest potential for reducing energy use by computer control, and that effective hierarchical control at the plant level requires the integration of these operations into one or more control loops. No control system has been found that provides reliable, fully automated control of recovery boilers for an extended period of time. The total technical potential for fuel savings was estimated at 0.2 quadrillion Btu's a year, or the equivalent of 94,000 barrels of oil per day. (ERA citation 05:036845)

DOE/CS/40263-T1 PC **A05**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Energy Conservation in Citrus Processing. Technical Progress Report, October 1, 1979-March 31, 1980.
15 Jun 80, 89p
Contract AC03-79CS40263

The Sunkist Citrus Plant in Ontario, California, processes about 6 million pounds of citrus fruit per day to make products which include frozen concentrated juice; chilled, pasteurized, natural strength juice; molasses from peel; dried meal from peel; pectin; citrus oil; and bioflavonoids. The energy intensive operations at the plant include concentration, drying, and refrigeration. The objective of the two-year two-phase project is to identify an economically viable alternative to the existing method of meeting energy requirements. Progress on the technical work of Phase I is reported. The following are summarized: requirements (energy price projection, atmospheric emission requirements, citrus juice quality constraints, economic evaluations); characterization (basic citrus processing operations, energy consumption and fruit processed vs time, identification and measurement of energy uses, energy balance for a typical citrus juice evaporator); and thermodynamic analysis (heat pump model, thermal evaporator, and cogeneration model). (ERA citation 05:035091)

DOE/EIA/AR-0232 PC **A03**/MF **A01**
Department of Energy, Washington, DC. Office of Energy Use Analysis.
Replacement Energy Costs in the Residential and Commercial Sector 1985, 1990 and 1995. Analysis Report AR/EUA/80-23.
M. Rodekohr. Jul 80, 37p

Replacement costs are the costs to the nation for providing the consumer with an additional unit of a given form of energy, excluding energy related subsidies and taxes and including the value of selected externalities. The results of this analysis show that energy replacement costs of all fuels are expected to grow in real terms over the 1985 to 1995 time period, with natural gas experiencing the largest growth rate and electricity experiencing the lowest growth rate. The large growth rate of natural gas prices is due to the wellhead price decontrol provisions of the Natural Gas Policy Act of 1978. The incremental pricing provisions of this legislation keeps the average natural gas price well below the marginal natural gas price. The low growth rate of electricity replacement cost is due to a relatively (to recent history) small demand for new capital equipment expenditures in this sector which are, in turn, due to the relatively (to recent history) low electricity demand growth rate; and, regional variation in electricity prices is overstated due to the modeling assumption that electricity cannot be sold between regions. This assumption implies that all power produced in a region can only be sold in that region when, in fact, electricity is often sold between regions. Interregional selling and production of electricity tends to make regional price differences lower than what appears in this analysis. (ERA citation 05:036824)

DOE/EIA-0133/77 PC **A02**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
World Natural Gas: 1977.
20 Jul 79, 11p

In this report, tables are presented for natural gas production by countries; gross production of natural gas by type of well; natural gas used for repressuring or wasted by countries, and world natural gas trade. (ERA citation 05:034565)

DOE/EIA-0173(79)3 PC **A16**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
Annual Report to Congress, 1979. Volume 3. Projections.
1979, 371p

This volume of the Energy Information Administration (EIA) Annual Report to Congress presents projections of energy production, consumption, and prices. An analysis of the world oil market provides the basis for three separate assumptions about how the price of internationally traded oil may evolve. Projections are provided for both world and domestic energy markets, based on the three assumed oil price paths. Estimates of world energy production and consumption are provided for 1985, 1990, and 1995. Separate domestic projections are given for three time frames: the short term (1980 and 1981), the midterm (1985, 1990, and 1995), and the long term (2000, 2010, and 2020). The sensitivity of the projections to key assumptions also is investigated. (ERA citation 05:033696)

DOE/EIA-0174(80/1) PC **A03**/MF **A03**
Department of Energy, Washington, DC. Energy Information Administration.
Energy Data Report: Solar Collector Manufacturing Activity, January Through June 1980.
Oct 80, 46p

Total shipments of solar thermal collectors during the first half of 1980 were 8.83 million square feet produced by 223 manufacturers (including 43 nonrespondents). Compared to the previous 6-month period, producer shipments increased by 1.48 million square feet. During January through June 1980 shipments were 1.93 million square feet higher than in the period January through June 1979. Shipments by 12 photovoltaic manufacturers during the first half of 1980 totaled 1841 peak kilowatts. (ERA citation 05:036487)

DOE/EIA-0181 PC **A02**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
Energy Data Report: Annual Energy Balance, 1978.
Apr 79, 8p

US energy production in 1978 increased for the third consecutive year. The 61.0 quadrillion Btu produced in 1978 was 0.63 quadrillion Btu or 1.0% greater than that during 1977 and represented the largest annual increase since 1972. Petroleum (including crude oil, lease condensate and natural gas plant liquids) was the nation's principal domestic energy source in 1978, supplying 33.8% of total production. Electricity production from nuclear powerplants increased 10% in 1978 to a record 276 billion kWh, 12.5% of total energy output. Hydropower electricity production totaled 281 billion kWh, 27.1% above the 1977 level when output was its lowest in recent years because of drought conditions in western states. US energy consumption in 1978 totaled 78.01 quadrillion Btu, 1.9% higher than that during 1977. Consumption of refined petroleum products, the major item of energy consumption, was 37.79 quadrillion Btu in 1978. This represented 48.4% of total energy consumption and was 1.6% greater than the 1977 level. Natural gas and coal consumption declined slightly during 1978. Non-fossil sources continued to provide a growing share of energy consumption, accounting for 7.9% of the total in 1978 compared with 5.3% in 1973. Consumption of energy in the electric utilities sector in 1978 was 4.9% above the 1977 level, the largest increase for any sector. Energy consumption in the residential and commercial sector and the transportation sector increased a modest 1.6% and 2.6%, respectively. Only the industrial sector had a decrease, a decline of 2.3%. In current dollars, the price of domestically produced energy continued to increase. (ERA citation 05:033757)

DOE/ET/20247-T1 PC **A03**/MF **A01**
Arizona Univ., Tucson. Optical Sciences Center.
Chemical Vapor Deposition of Refractory Metal Reflectors for Spectrally Selective Solar Absorbers. Annual Report, May 1, 1978-April 30, 1979.
B. O. Seraphin, and G. E. Carver. May 79, 26p
Contract AS04-76ET20247

Three methods are described to fabricate by chemical vapor deposition (CVD) molybdenum films which rival conventional mirror materials in their infrared reflectance. With an absolute reflectance of 97.4% at 10 mu m, these Super Molybdenum films reflect better than any other molybdenum film previously reported. When deposited in the presence of oxygen, films of a reduced reflectance over the solar emission range result. If passivated and antireflected by a Si sub 3 N sub 4 layer, such Black Molybdenum films are characterized by a solar absorptance value in excess of 90% and a thermal emittance value of 11% at 500 exp 0 C. No deterioration of these values has yet been observed in ongoing tests after 1000 hours exposure to 500 exp 0 C in a 1 Torr vacuum. Stacks containing Super Molybdenum as the reflector and amorphous silicon as the absorber have thus far survived 1000 hours in open air at 500 exp 0 C. (ERA citation 05:036488)

DOE/ET/20475-T1 PC **A13**/MF **A01**
TRW, Inc., McLean, VA. Energy Systems Planning Div.
Energy Conservation: Program Summary Document, FY 1981.
Feb 80, 285p
Contract AC01-79ET20475

An overview is presented of the Energy Conservation Programs being implemented by the Office of the Assistant Secretary for Conservation and Solar Energy in DOE. This document together with the Solar Energy and Energy Storage Program Summary Documents covers all programs of the Office of Assistant Secretary for Conservation and Solar Energy. Consistent with the FY 1981 budget, conservation objectives, Federal strategy, impacts, and issues are presented in this document for the following programs: buildings and community systems; industrial energy conservation; transportation; state and local; multi-sector appropriate technology; energy inventions; energy conversion technology; energy information campaign; and energy impact assistance. The principal purposes of this document are to provide an Energy Conservation reference book for Congress and to disseminate information to the general public. Chapter I contains an Introduction and FY 1981 Budget Summary. Chapter II contains an Overview of Energy Conservation. The remaining chapters provide information on individual programs. (ERA citation 05:036805)

DOE/NASA/CR-161509 PC **A05**/MF **A01**
IBM Federal Systems Div., Huntsville, AL.
Solar Energy System Performance Evaluation: Seasonal Report for IBM System 4 at Clinton, Mississippi.
Jul 80, 94p
Contract AI01-76CS31037

The IBM System 4 Solar Energy System was designed to provide 35 percent of the space heating and 62 percent of the domestic hot water (DHW) preheating for a single-family residence located within the United States. The system is a prepackaged unit called the Remote Solar Assembly which has been integrated into the heating and DHW system in a dormitory in Clinton, Mississippi. The system consists of 259 square feet of Solaron 2001 Series flat-plate-air collectors, a rock thermal storage containing 5 1/2 ton of rock, heat exchangers, blowers, a 52 gallon preheat tank, controls, and associated plumbing, two 30 gallon electric water heaters draw water from the preheat tank. A 20 kilowatt, duct mounted, electric heater supplies auxiliary energy. This system which has three modes of system operation was activated September, 1978. A system performance assessment is presented. (ERA citation 05:033470)

DOE/NASA/CR-161539 PC **A05**/MF **A01**
IBM Federal Systems Div., Huntsville, AL.
Solar Energy System Performance Evaluation: Seasonal Report for Colt Yosemite, Yosemite National Park, California.
Aug 80, 89p
Contract AI01-76CS31037

The Solar Energy System, Colt Yosemite, was designed to provide 52% of the heating (2500 sq ft area) for the Visitors Center at Yosemite National Park, California. The system consists of 980 sq ft of Colt A-151 series flat-plate liquid collectors, a petroleum-base thermal energy transport fluid, a 2500 gallon water-filled solar energy storage tank, heat exchangers, pumps, controls and associated plumbing. Solar heated water is pumped through a liquid-to-air heat exchanger in the space heating supply duct. Auxiliary hot water is provided from an oil-fired boiler to a second liquid-to-air heat exchanger when the solar energy is not sufficient to meet the space heating demand. There are four modes of system operation. (ERA citation 05:036473)

DOE/NASA/CR-161546 PC **A05**/MF **A01**
IBM Federal Systems Div., Huntsville, AL.
Solar Energy System Performance Evaluation: Seasonal Report for Wormser, Columbia, South Carolina.
Aug 80, 91p
Contract AI01-76CS31037

The Wormser Solar Energy System located in a four unit townhouse apartment (5400 square feet) in Columbia, South Carolina was designed to provide 50% of the hot water and 70% of the space heating by the Wormser Scientific Corporation, Stamford, Connecticut. The Solar Energy System consists of 266 ft exp 2 of pyramidal optics, flat-plate liquid collectors, a solar window area of 1152 ft exp 2 , a 2500 gallon thermal water storage tank, an energy transport system (water), heat exchangers, pumps, controls and four domestic hot water (DHW) tanks. Electrical elements in each domestic hot water tank provide necessary auxiliary energy for hot water. Four multifunctional heat pumps, supplied with solar heated water provide space heating energy to the apartments, collector freeze protection is provided through the location of the collectors inside the attic. The system with six modes of operation became oprational in February 1978. The following topics are discussed: system description, performance assessment, operating energy, energy savings, maintenance, summary and conclusions. (ERA citation 05:036474)

DOE/RA/04934-07 PC **A04**/MF **A01**
Franklin Pierce Law Center, Concord, NH. Energy Law Inst.
Legal Obstacles and Incentives to the Third Development of Small-Scale Hydroelectric Potential in the Six New England States: Executive Summary.
May 80, 75p
Contract AS02-78RA04934

This executive summary describes the relationship of Federal law and regulation to state law and regulation of small-scale hydroelectric facilities. It also highlights important features of the constitutional law, statutory law, case law, and regulations of each of the six New England states. The summary may serve as a concise overview of and introduction to the detailed reports prepared by the Energy Law Institute on the legal and regulatory systems of each of the six states. The dual regulatory system is a function of the federalist nature of our government. This dual system is examined from the standpoint of the appropriate legal doctrine, i.e., the law of pre-emption, and the application of this law to the case of hydroelectric development. The regulation of small dams are discussed and flow diagrams of the regulations are presented for each of the six states - Maine, Massachusetts, Vermont, New Hampshire, Vermont, and Connecticut. (ERA citation 05:036208)

DOE/RG/06428-02 PC **A18**/MF **A01**
Stone and Webster Management Consultants, Inc., New York.
Techniques of Analyzing the Impacts of Certain Electric-Utility Ratemaking and Regulatory-Policy Concepts. Bibliography.
Aug 80, 412p
Contract AC01-78RG06428

This bibliography provides documentation for use by state public utility commissions and major nonregulated utilities in evaluating the applicability of a wide range of electric utility rate design and regulatory concepts in light of certain regulatory objectives. Part I, Utility Regulatory Objectives, contains 2084 citations on conservation of energy and capital; efficient use of facilities and resources; and equitable rates to electricity consumers. Part II, Rate Design Concepts, contains 1238 citations on time-of-day rates; seasonally-varying rates; cost-of-service rates; interruptible rates (including the accompanying use of load management techniques); declining block rates; and lifeline rates. Part III, Regulatory Concepts, contains 1282 references on restrictions on master metering; procedures for review of automatic adjustment clauses; prohibitions of rate or regulatory discrimination against solar, wind, or other small energy systems; treatment of advertising expenses; and procedures to protect ratepayers from abrupt termination of service. (ERA citation 05:036759)

DOE/RG/06428-03 PC **A14**/MF **A01**
Stone and Webster Management Consultants, Inc., New York.
Techniques for Analyzing the Impacts of Certain Electric-Utility Ratemaking and Regulatory-Policy Concepts. Regulatory Laws and Policies.
Aug 80, 310p
Contract AC01-78RG06428

This report is a legal study prepared to provide a review of the substantive and procedural laws of each regulatory jurisdiction that may affect implementation of the PURPA standards, and to summarize the current state of consideration and implementation of policies and rate designs similar or identical to the PURPA standards by state regulatory agencies and nonregulated utilities. This report is divided into three sections. The first section, the Introduction, summarizes the standards promulgated by PURPA and the results of the legal study. The second section, State Regulatory Law and Procedure, summarizes for each state or other ratemaking jurisdiction: (1) general constitutional and statutory provisions affecting utility rates and conditions of service; (2) specific laws or decisions affecting policy or rate design issues covered by PURPA standards; and (3) statutes and decisions governing administrative procedures, including judicial review. A chart showing actions taken on the policy and rate design issues addressed by PURPA is also included for each jurisdiction, and citations to relevant authorities are presented for each standard. State statutes or decisions that specifically define a state standard similar or identical to a PURPA standard, or that refer to one of the three PURPA objectives, are noted. The third section, Nonregulated Electric Utilities, summarizes information available on nonregulated utilities, i.e., publicly or cooperatively owned utilities which are specifically exempted from state regulation by state law. (ERA citation 05:036760)

EPRI-EM-1506-SY PC **A04**/MF **A01**
Aerospace Corp., El Segundo, CA. Energy and Resources Div.
Solar Heating and Cooling of Buildings (SHACOB): Requirements Definition and Impact Analysis-II.
C. K. Cretcher. Sep 80, 53p

A study conducted to determine the potential impact of the widespread implementation of solar heating and cooling systems on the utility load, utility operating costs, and customer costs for the years 1990 and 2000 is summarized. The study concluded that although results and recommendations vary among the utilities and regions studied, SHACOB installations can result in reduced electric demand. In addition, savings in utility operating costs and capital requirements for new plant construction may accrue to the utilities. (ERA citation 05:036476)

EPRI-WS-78-142 PC **A04**/MF **A01**
Institute for the Future, Menlo Park, CA.
Workshop Proceedings: Noneconomic Factors in Energy Supply and Demand.
G. Schmid, and A. Lipinski. Jun 80, 51p CONF-7906179-(Sum.)

Noneconomic factors in energy supply and demand workshop, Airlie, VA, USA, 18 Jun 1979.

Uncertainty in energy forecasting arises, in part, from inadequate understanding of noneconomic factors that bear on energy choices and from the difficulty of modeling these factors. Forecasting models based on purely economic factors do not adequately reflect the current circumstances in the US. The workshop participants identified the political, policymaking, regulatory, and social variables that influence the planning processes of utilities today; they also reviewed the modeling techniques for dealing with these noneconomic variables and provided a number of new suggestions for handling them in decision-oriented modeling. Suggestions of areas of future research in modeling noneconomic factors relevant to utility management were made. Brief summaries are presented here of specific papers presented on: politics in the Middle East, land-use decisions, health concerns, demographic factors, technology, government regulation, consumer values, and organizational adjustments. (ERA citation 05:036743)

FE-2468-81 PC **A04**/MF **A01**
Engineering Societies Commission on Energy, Inc., Washington, DC.
Research Programs Relevant to Fossil-Energy Technology. Final Report.
L. D. Conta. Aug 80, 61p
Contract AC01-77ET10679

The pace of energy-related R and D by government and non-government entities has accelerated greatly in recent years. Within the broad spectrum of R, D, and D activities, it is often difficult to adequately analyze the numerous programs to ensure effective interactions among programs. Effective interactions are necessary to improve the quality of individual programs, minimize redundancy, and eliminate gaps. This report is an overview of energy R, D, and D programs in government agencies, industry, and the professional societies as they appear to be of particular importance to the development of fossil-energy technologies. It is not an exhaustive examination of energy R, D, and D program details, but is illustrative of the diversity of programs and sponsoring organizations involved and points to the interrelationship of the research activities. A framework is provided upon which the potential for additional technology transfer and cooperative efforts can be examined. (ERA citation 05:036751)

LA-UR-80-2330 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Conservation and Solar: Working Together.
J. D. Balcomb. 1980, 8p CONF-801016-11
Contract W-7405-ENG-36
National passive solar conference, Amherst, MA, USA, 19 Oct 1980.

A methodology is developed for optimally allocating resources between conservation and solar strategies in building design. Formulas are presented for a constrained optimum in which the initial investment is limited. A global optimum procedure is also described in which life-cycle cost is minimized. The procedure is amenable to hand analysis if tables are available which give the Solar Savings Fraction as a function of the Load Collector Ratio for the locality. A numerical example is given. (ERA citation 05:033481)

LA-UR-80-2556 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Performance Estimation Using Correlation Methods.
J. D. Balcomb. 1980, 5p CONF-800972-4
Contract W-7405-ENG-36
1980 Department of Energy passive and hybird solar energy program update meeting, Washington, DC, USA, 21 Sep 1980.

Correlation methods of prediction have advantages in greatly simplifying the time and complexity of performance predictions of passive solar buildings but are severely constrained in the number of variables which can be considered. Their accuracy is generally adequate for design purposes provided they are applied to buildings which correspond reasonably closely to the reference designs used in developing the correlations. The most simplified correlation procedures (such as the SLR

method) are amenable to use with hand calculators, especially if pre-calculated tables are available corresponding to the weather data for the location of interest. When reporting the results of these calculations, the designer should be especially careful to specify the range of validity of the analysis, especially as pertains to both operating characteristics and design parameters. Correlation techniques are especially amenable to use in microcomputer routines which can be used in a design office. Very quick answers can be obtained during the schematic design and design development phases of a building to aid in deciding between different design options. This would include trade-offs between various conservation options and passive solar options. (ERA citation 05:036477)

LA-UR-80-2687 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
LASL Passive Program.
D. A. Neeper. 1980, 4p CONF-800972-2
Contract W-7405-ENG-36
1980 Department of Energy passive and hybird solar energy program update meeting, Washington, DC, USA, 21 Sep 1980.

Recent accomplishments are outlined on the following tasks: (1) solar load ratio for sunspaces; (2) thermal performance of components and buildings; (3) convective loop test; (4) similarity study of interzone convection; (5) evaluation of phase-change thermal storage; (6) off-peak electrical auxiliary heating; (7) passive solar design handbook; (8) program support to DOE; and (9) passive cooling for residences. (ERA citation 05:036478)

LA-8455-MS PC **A09**/MF **A01**
Los Alamos Scientific Lab., NM.
Energy-Related Applications of Helium: A Revision of the ERDA-13 Data Base.
E. F. Hammel, and M. C. Krupka. Aug 80, 180p
Contract W-7405-ENG-36

A re-examination, revision, and re-evaluation of the data base contained within the 1975 document, ERDA-13, The Energy-Related Applications of Helium, were completed and results are presented in this report. New technical and resource data, current legislative proposals, updated supply-and-demand relationships, latest legal developments, programmatic changes affecting the future demand for helium, socio-economic aspects, and the effects of the latest energy-consumption projections were considered and are discussed. In contrast to ERDA-13, however, explicit recommendations with respect to the formulation of Federal helium policy, as it pertains to the energy-related applications of helium, are not given. (ERA citation 05:036732)

LBL-10825 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Dynamic Modeling and Experimental Simulation of Active Solar Energy Systems for the Evaluation of Control Strategies.
S. R. Schiller, M. L. Warren, and M. Wahlig. Jul 80, 9p CONF-801102-26
Contract W-7405-ENG-48
ASME winter annual meeting, Chicago, IL, USA, 16 Nov 1980.

Dynamic modeling and experimental simulation are used to evaluate control strategies for active solar energy systems. Performance of proportional and on/off collector loop controllers are evaluated and compared using a theoretical dynamic collector model. Use of the experimental test facility at Lawrence Berkeley Laboratory for evaluating the affect of controls and control strategies on hydronic space heating system performance is also discussed. Both the computer model and the test facility allow evaluation of control strategies using various flow rates, controller set points, insolation patterns, ambient temperature conditions, and collector types. The test facility also allows comparison of collector and load loop flow strategies based on various system configurations and building load demands. (ERA citation 05:036479)

NP-25005 PC **A17**/MF **A01**
Indian Inst. of Tech., Bombay.
Nonconventional Sources of Energy: Notes on Short-Term Course.
A. G. Mudgal. 1980, 387p
U.S. Sales Only.

A separate abstract was prepared for each of the 27 presentations. All will appear in the DOE Energy Data Base (EDB); seventeen were selected for Energy Research Abstracts (ERA); and eight were selected for Energy Abstracts for Policy Analysis. (ERA citation 05:036778)

NP-25120 PC **A04**/MF **A01**
Tennessee Valley Authority, Knoxville.
Municipal and Cooperative Distributors of TVA Power: 1979 Operations.
1979, 72p

This is a report of the operations during the fiscal year ended June 30, 1979, of the 110 municipal and 50 cooperative electric systems that distribute TVA power to 2.7 million customers. The areas served by these locally owned distributors include 80,000 square mile in parts of seven states and have a population of well over 6 million. Data for this report were gathered by TVA from annual reports and other material prepared by each of these 160 distributors. TVA has reported its own power operations in its Power Annual Report for its fiscal year ending September 30, 1979. Specific information is presented on: sales, revenues and expenses, construction and capital financing, rates, earnings, energy conservation, load management, PURPA. (ERA citation 05:036761)

NP-25124 PC **A04**/MF **A01**
Deutsche Verbundgesellschaft e.V., Heidelberg (Germany, F.R.).
Assured Power Supply and Electricity Rates Based on the Actual Costs.
67p
In German.
U.S. Sales Only.

According to the electric power industry, any state regulation forcing utilities to tolerate the use of their supply network by other suppliers would not enhance competition in favor of all consumers - it would only bring a short-term advantage to some of the major consumers. At the same time, supply assurance would be endangered, an un-social pricing policy would be instigated, and the power supply industry would be concentrated in a manner adverse to competition. According to this, fixed supply territories are still a basic precondition for an assured and profitable electric power supply. (ERA citation 05:036770)

NP-25125 PC **A02**/MF **A01**
Hauptberatungsstelle fuer Elektrizitaetsanwendung e.V., Frankfurt am Main (Germany, F.R.).
Electric Power Replacing Oil: The Development of Hot Water Supplies to Private Households in the Federal Republic of Germany.
Oct 79, 13p
In German.
U.S. Sales Only.

With 95% of energy supplies imported, it is evident how important it is in the framework of energy supply to replace petroleum with domestic energy sources which are not subject to crisis. The energy program of the Federal Republic of Germany established in 1973, and continued from 1974 to 1977, has focussed on that tissue. The paper at hand intends to show favorable prospects involved in substituting oil by heating hot water with electric power. Generally available statistics and analyses were the basis as well as a market enquiry covering 35,000 households, the evaluation of which was concluded in 1979. This material clearly shows that 27% of the total final energy consumption in the FRG go to the consumption area household, out of which 9% - corresponding to 2.4% of the total needs of final energy - go to hot water supplies. At first glance, this figure seems small. However, households use as much energy as, e.g., the total traffic of rail, ship and air in the FRG. The objective to be attained by this compilation is to make useful facts and figures available by illustrating the situation and presenting the course of discussions to be expected concerning energy policy. (ERA citation 05:036826)

ORNL/HUD/MIUS-53 PC **A04**/MF **A01**
Oak Ridge National Lab., TN.
Application of Modular Integrated Utility Systems (MIUS) Concept as a Strategy for Urban Rehabilitation and Redevelopment.
R. E. Gant. Sep 80, 69p
Contract W-7405-ENG-26

The potential role of the Modular Integrated Utility System (MIUS) as a strategy for implementing urban redevelopment and rehabilitation objectives is assessed. Major environmental, utility infrastructure, and national policy constraints to urban redevelopment efforts are examined. The emphasis is on high-density urban areas of major cities where planned redevelopment and rehabilitation efforts could be seriously impeded by lack of existing utility infrastructures, inadequate service, and restrictive environmental legislation. The current status of air quality, potable water quality, regional solid waste disposal capacity, and capabilities of liquid waste treatment systems is described for the nation's 100 largest metropolitan areas. The MIUS concept is evaluated as a community development strategy capable of complying with environmental regulations, upgrading utility services, and supporting high-density urban development. Examples are developed which indicate that the MIUS concept could be used in high-density residential and commercial areas to permit development without major disruptions to surrounding areas. A case study of Philadelphia, Pennsylvania was undertaken to characterize the role of MIUS in an existing urban environment. Housing patterns, planned redevelopment efforts, concerns for community ethnic integrity, high utility costs, and a proposed metropolitan district heating system make the MIUS concept attractive for Philadelphia's urban strategy. (ERA citation 05:033813)

PB81-118028 PC **A03**/MF **A01**
New York State Energy Office, Albany.
New York State Energy Master Plan and Long-Range Electric and Gas Report. Volume 1. Executive Summary.
Final rept.
Mar 80, 41p
See also Volume 2, Appendices, PB81-118036.
Also available in set of 3 reports PC E14, PB81-118010.

Partial listing of topic areas include: Scope and impact of planning process; Structure of master plan; State energy policies; Current and forecast energy requirements; Reshaping the state's energy future; Schedule for planning process.

PB81-118036 PC **A08**/MF **A01**
New York State Energy Office, Albany.
New York State Energy Master Plan and Long-Range Electric and Gas Report. Volume 2. Appendices.
Final rept.
Mar 80, 165p
See also Volume 1, PB81-118028 and Volume 3, PB81-118044.
Also available in set of 3 reports PC E14, PB81-118010.

A partial listing of contents includes: Summary of the plans of major energy suppliers; Forecast of New York state energy requirements; Economic impact analysis.

PB81-118044 PC **A10**/MF **A01**
New York State Energy Office, Albany.
New York State Energy Master Plan and Long-Range Electric and Gas Report. Volume 3.
Final rept.
Mar 80, 219p
See also Volume 2, Appendices, PB81-118036.
Also available in set of 3 reports PC E14, PB81-118010.

A partial listing of contents includes: Policy context; New York state energy-use energy requirements, base case; Plan elements--overview; Conservation; Research and development plan; Energy financing--Institutional changes; Impact of rising energy costs on low income households; Long-range electric and gas report.

PB81-800344 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Fuel Consumption: Transportation. 1977-October, 1980 (Citations from the NTIS Data Base).
Rept. for 1977-Oct 80,

Audrey S. Hundemann. Nov 80, 187p
Supersedes PB80-800451, and NTIS/PS-78/0708. See also 1964-1976, NTIS/PS-78/0707.

Fuel consumption by automobiles, trucks, buses and general aviation aircraft is discussed. Topic areas cover the effect of road conditions, traffic conditions, and emission controls on fuel economy; projected growth and problems facing air transportation; energy efficiency of various urban transportation modes; energy use forecasts and projections of supply and demand in the transportation sector. Bibliographies on fuel consumption in the industrial, residential, and commercial sectors and on electric power consumption are also available. (This updated bibliography contains 180 citations, 32 of which are new entries to the previous edition.)

PB81-800369 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Fuel Consumption: Industrial, Residential, and General Studies. 1977-October, 1980 (Citations from the NTIS Data Base).
Rept. for 1977-Oct 80,
Audrey S. Hundemann. Nov 80, 176p
Supersedes PB80-800469, and NTIS/PS-78/0710. See also 1964-1976, NTIS/PS-78/0709.

Citations of research on fuel supply, demand, shortages, and conservation through effective utilization are presented. A few abstracts pertain to energy consumption in the agricultural sector, fuel substitution, economic studies, and environmental concerns relating to energy consumption. Bibliographies on electric power consumption and fuel consumption by transportation also are available. (This updated bibliography contains 140 citations, 10 of which are new entries to the previous edition.)

PNL-SA-7322 PC **A02**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Environmental Concerns Influencing the Future Development of Energy Material Transportation Systems: The Year 2000 Study.
J. G. DeSteese. 1978, 11p CONF-7811174-1
Contract AC06-76RL01830
US DOE environmental control symposium, Argonne, IL, USA, 28 Nov 1978.

This paper presents results of studies conducted to assess the potentially longer-range problems which could hinder the future development of safe and environmentally-acceptable energy material transportation systems. The purpose of this effort is to recommend appropriate action that contributes to the anticipatory management of possible future problems before they can have serious effects on the adequacy or acceptability of the system. Most significant future concerns in energy material transportation relate to potential institutional, legal, political and social problems. Environmental issues are involved in many of these concerns. Selected environmental concerns are discussed that may influence the future development of transportation systems for fossil and nuclear energy materials during the balance of this century. A distinction between potentially real and perceived concerns is made to emphasize basic differences in the recommended approach to solutions of the respective type of potential problem. (ERA citation 05:035042)

PNL-3529 PC **A09**/MF **A01**
Battelle Human Affairs Research Centers, Seattle, WA.
Institutional Analysis for Energy Policy.
F. A. Morris, and R. J. Cole. Jul 80, 178p
Contract AC06-76RL01830

This report summarizes principles, techniques, and other information for doing institutional analyses in the area of energy policy. The report was prepared to support DOE's Regional Issues Identification and Assessment (RIIA) program. RIIA identifies environmental, health, safety, socioeconomic, and institutional issues that could accompany hypothetical future scenarios for energy consumption and production on a regional basis. Chapter 1 provides some theoretical grounding in institutional analysis. Chapter 2 provides information on constructing institutional maps of the processes for bringing on line energy technologies and facilities contemplated in RIIA scenarios. Chapter 3 assesses the institutional constraints, opportunities, and impacts that affect whether these technologies and facilities would in fact be developed. Chapters 4 and 5 show how institutional analysis can support use of exercises such as RIIA in planning institutional change and making energy policy choices. (ERA citation 05:036725)

SAND-79-2134 PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Steady-State Wind Loading on Parabolic-Trough Solar Collectors.
D. E. Randall, D. D. McBride, and R. E. Tate.
Aug 80, 20p
Contract AC04-76DP00789

Two wind tunnel force and moment tests have been conducted on parabolic-trough solar collector configurations. The two tests were conducted in different flow field environments, one a uniform flow infinite airstream, the second a simulated atmospheric boundary layer flow with the models simulating a ground-mounted installation. The force and moment characteristics of both isolated single-module troughs and of trough modules within array configurations have been defined over both operational and stow attitudes. The influence of various geometric design parameters for collector modules and arrays has been established. Data indicate that forces and moments increase with mounting height and with trough aspect ratio. Collector modules interior to large arrays experience wind force reductions as high as 50 to 65%, while appropriate fences or berms surrounding the arrays can provide exterior modules with protection of this order. (ERA citation 05:036490)

SAND-80-0385C PC **A03**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Frequency Response Analysis of Fluid Control Systems for Parabolic Trough Solar Collectors.
R. Schindwolf. 1980, 27p CONF-801102-5
Contract AC04-76DP00789
ASME winter annual meeting, Chicago, IL, USA, 16 Nov 1980.

Previous studies of solar collector fluid control systems have utilized computer simulations of collector and piping dynamics to evaluate stability and response characteristics. To obtain reasonable simulation accuracy requires substantial computer memory and time, and is well beyond the capability of small desk-top computers. Here a linearized steady state frequency response is derived for parabolic trough collectors and for connecting piping, which can be used in standard gain-phase analyses to evaluate system stability and closed loop frequency response. The frequency response characteristics of a typical collector string and piping are used in a gain-phase analysis to get some insight into the effect on system stability of various system parameters such as controller gain, sensor and controller time constants, and sensor location. (ERA citation 05:036491)

SERI/TR-334-601 PC **A03**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Polymers in Solar Technologies: An R and D Strategy.
W. F. Carroll, and P. Schissel. Jul 80, 37p
Contract AC02-77CH00178

The use of polymers can increase the cost-effectiveness of solar technologies. The potential impact of polymers may be enhanced earlier if R and D is carried out according to a plan. The purpose of this plan is to present a five-year program consisting of 20 tasks categorized into six major problem areas: response to combined stresses; photochemistry; permeability/adhesion; surface properties; mechanical properties; and development of polymers. A budget required for each task is estimated and summarized for each problem area. It is shown that the potential future impact of polymers on the economics of solar technologies justifies the proposed expenditures. (ERA citation 05:033521)

SOLAR/0010-80/08 PC **A12**/MF **A01**
Automation Industries, Inc., Silver Spring, MD. Vitro Labs. Div.
Environmental Data for Sites in the National Solar Data Network.
Aug 80, 257p
Contract AC01-79CS30027

The Detartment of Energy's National Solar Data Program established solar energy systems in residential and commercial buildings across the United States. These solar sites are linked to Vitro Laboratories Division's computer in the National Solar Data Network (NSDN). Vitro collects and analyzes data from this network to determine the thermal performance of each of the solar systems. Environmental information collected at the sites for the month of August 1980 is presented. The environmental data for the NSDN are presented in the form of tables for each solar site. The solar sites are grouped into 12 zones, each of which consists of several adjacent states. The solar energy sites are in alphabetical sequence within each zone. The tables provide available meteorological data for reporting sites in the NSDN as follows: (1) Insolation: the insolation table presents the total, diffuse, direct, maximum, and extra-terrestrial radiation for the solar site. It also shows the ratio of total extra-terrestrial radiation, as a percent; (2) Temperature: the temperature table gives the average, daytime, nighttime, maximum, minimum, and Inlet-water temperatures for the solar site. Additional tables are presented for some of these NSDN sites, supplying either wind or relative humidity data, or both. All of the passive and some of the active solar sites are equipped with wind sensors. These provide information for two wind tables. The first furnishes wind speed and direction. The second table correlates wind speed with time (hours for a range of speeds) for each day. The humidity table provides relative humidity values for day and night. It also gives values for the maximum and minimum humidity for each day. A technical discussion of the instruments and measurements used to obtain these data tables is given. (ERA citation 05:036214)

10B. Power Sources

AD-A090 908/5 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Shallow-Homojunction GaAs Cells with High Resistance to 1-MeV Electron Radiation.
Journal article,
John C. C. Fan, Ralph L. Chapman, Carl O. Bozler, and Peter Drevinsky. 23 Jul 79, 5p JA-5017, ESD-TR-80-61
Contract F19628-80-C-0002
Pub. in Applied Physics Letters, v36 n1 p53-56, 1 Jan 80.

No abstract available.

AD-A090 943/2 PC **A13**/MF **A01**
Air Force Communications Service Scott AFB IL Operations Research Analysis Office
Uninterruptible Power Systems: Operational and Cost Considerations.
Final rept.,
Marko Milakovich, and Charles E. Jacobs. Mar 77, 292p Rept no. 12-ORR-77

A study of cost and potential benefits of Uninterruptible Power Systems (UPS) for Air Force communication systems was made, using data from four specific systems. An important conclusion was that UPS justifications should not be based on marginal increased in power availability but upon requirements for 'clean' power needed by modern computers and other devices using low-voltage, low-power logic circuits. Such circuits may be particularly susceptible to transients, surges, dropouts, overvoltages and undervoltages (brownouts) which are common anomalies of power furnished by public utility companies. UPS may be needed more to clean up 'dirty' power during the 99+% of time it is available, than to furnish power during prime-power outages. (Author)

AD-B028 686/4 PC **A04**/MF **A01**
Hughes Aircraft Co., Los Angeles, CA. Space and Communications Group.
High Temperature Bonding Techniques for Solar Cell Array.
Final rept. Mar 76-Jun 77,

G. LaFontaine, F. Marsh, H. Levin, F. Sinsheimer, and G. Wolff. Nov 77, 62p SCG-70534R, AFAPL-TR-77-88
Contract F33615-76-C-2032
Distribution limitation now removed.

An adhesive for solar cell attachment to spacecraft substrates has been sought with an unusually demanding combination of properties. These include (1) a basic resistance to decomposition at 600 C in vacuum, (2) retention of elastic properties at liquid nitrogen temperature, and (3) processibility as a bond line at conditions convenient to typical spacecraft fabrication. Of all the elastomeric materials available, the class of inorganic polymers termed poly (carboranesiloxanes) appears to be the only viable candidate. The ultrahigh molecular species of this group have been found to be attractive, especially when blended or alloyed with low molecular weight versions. This promising assessment is based on high temperature thermovacuum stability studies, various characterization measurements, elasticity measurements at cryogenic temperatures, and 45 peel studies of thermally cycled bond lines with varying adherend combinations. (Author)

ANL/MHD-79-17 PC **A05**/MF **A01**
Argonne National Lab., IL.
Technical Support for Open-Cycle MHD Program. Progress Report, January-June 1979.
D. H. Bomkamp. Jul 80, 94p
Contract W-31-109-ENG-38

The support program for open-cycle MHD at the Argonne National Laboratory consists of developing the analytical tools needed for investigation of the performance of the major components in the combined-cycle MHD/steam power system. The analytical effort is centered on the primary components of the system that are unique to MHD and, also, on the integration of these analytical models into a model of the entire power-producing system. The present project activities include modeling of the combustor, generator, seed deposition, and formation and decomposition of NO. Parametric studies were performed to evaluate the performance of the U-25B generator and to support the design of the US U-25B generator. Refinements and improvements to the MHD systems code and executive program are described. (ERA citation 05:036790)

ANL/MHD-80-1 PC **A04**/MF **A01**
Argonne National Lab., IL.
MHD Heat and Seed Recovery Technology Project. Eighth Quarterly Report, October-December 1979.
M. Petrick, and T. R. Johnson. Aug 80, 54p
Contract W-31-109-ENG-38

The MHD Heat and Seed Recovery Technology Project at Argonne National Laboratory is obtaining information for the design and operation of the steam plant downstream of the MHD channel-diffuser, and of the seed regeneration process. The project goal is to supply the engineering data required in the design of components for prototype and demonstration MHD facilities. The work is being done in close cooperation with the Heat Recovery-Seed Recovery facilities, which will be 20-MW prototypes of the MHD steam bottoming system. The primary effort of the HSR Technology Project is directed toward experimental investigations of critical issues, such as (1) NO/sub x/ behavior in the radiant boiler and secondary combustor; (2) radiant boiler design to meet the multiple requirements of steam generation, NO/sub x/ decomposition, and seed-slag separation; (3) effects of solid or liquid seed deposits on heat transfer and gas flow in the steam and air heaters; (4) formation, growth, and deposition of the seed-slag particles; (5) character of the combustion gas effluents; and (6) the corrosion and erosion of ceramic and metallic materials of construction. These investigations are performed primarily in a 2-MW test facility, Argonne MHD Process Engineering Laboratory (AMPEL). Other project activities are related to studies of the thermochemistry of the seed-slag combustion gas system. Activities are reported. (ERA citation 05:036791)

CONF-801102-16 PC **A02**/MF **A01**
Idaho National Engineering Lab., Idaho Falls.
DOE Small Hydropower Program.
W. W. Hickman, and T. B. McLaughlin. 1980, 8p
Contract AC07-76ID01570
ASME winter annual meeting, Chicago, IL, USA, 16 Nov 1980.

The scope of work and activities of the Department of Energy's National Small Hydropower Program are discussed. Each portion of the program is discussed to provide an overall view of the program's depth. The three major subprograms are the Demonstration Projects subprogram, the Engineering Development subprogram, and the Loan subprogram. Program results are presented by graphic illustrations where applicable. (ERA citation 05:036206)

CONF-801102-8 PC **A02**/MF **A01**
Lockheed Missiles and Space Co., Inc., Sunnyvale, CA.
Comparison of Major Characteristics of OTEC Power Systems.
M. I. Leitner, and C. M. Robidart. 1980, 18p
Contracts AC03-77ET20299, AC01-78ET21056
ASME winter annual meeting, Chicago, IL, USA, 16 Nov 1980.

In the course of its participation in various OTEC-related activities, both company and Government funded, Lockheed Ocean Energy Systems have had occasion to investigate two distinct approaches to the design of the power system. In 1977, LMSC was awarded one of the design study contracts for Power System Development (PSD)-I, which had the objective of utilizing shell and tube heat exchangers to develop a viable OTEC power plant. In 1978, LMSC received one of the design study contracts for Power System Development (PSD)-II, which differed from PSD-I in that it required incorporation of compact or shell-less heat exchangers into the power system. A comparison of the major characteristics of the power system, particularly in regard to the heat exchangers, is presented. These characteristics include, but are not limited to, relative heat transfer characteristics, size, cost-effectiveness, and fluid flow requirements. (ERA citation 05:036465)

CONS-8138-T2 PC **A17**/MF **A01**
Trident Engineering Associates, Inc., Annapolis, MD.
Powerplant Productivity Improvement Study: Demonstration of the DOE/MRI Methodology. Final Report.
17 Nov 78, 379p
Contract EM-77-F-01-8138

A methodology, distributed by DOE, may be used as a potential tool for the utility industry to assess and evaluate productivity and reliability problems of existing and future units. The model can be used to assess the impact of an improvement project or corrective action on unit productivity parameters such as heat rate, capacity factor, availability, or equivalent availability. The methodology analyzes: the effect of component redundancy on unit equivalent availability; the effect of component reliability on unit equivalent availability; and a component's outage trend to project the component's future outage rate. The first purpose of this study is to illustrate for the utilities how to apply the methodology. Thus, this report contains the analysis performed by applying the methodology at three units of Illinois power plants. The units evaluated were Wood River 5, Quad Cities 1, and Quad Cities 2. A total of 8 improvement projects were evaluated and all outage data and equations used are included in order to facilitate utility reproduction of the given results. The second purpose is to evaluate the methodology as a useful tool for individual utilities; a number of modifications are suggested. (ERA citation 05:035052)

COO-4049-17 PC **A02**/MF **A01**
Management and Technical Services Co., Philadelphia, PA.
DOE/PETC 5MW Two-Stage MHD Pressurized Coal Combustor: Operation, Maintenance, and Modification. Quarterly Activity Report, April 1, 1980-June 30, 1980.
H. J. Owoc. 25 Jul 80, 19p
Contract AM02-76PC04049

During this period, eight (8) combustor test runs were attempted, with the AVCO-designed MHD plasma Diagnostic Test Section (DTS) installed downstream of the combustor to measure the temperature and conductivity of the plasma and slag and to observe slag flow patterns and accumulation. Various insulating materials were installed between the fifty (50) copper plate electrodes, which comprise the bulk conductivity section of the DTS, to ascertain which material provided the highest electrical resistance. Obtaining accurate and meaningful resistance readings from the bulk conductivity units was complicated by the current leakage problems which developed from electrode to electrode, caused by the conducting rubber cooling water hoses supplied with the DTS by AVCO, and the moisture, seed and slag which penetrated the insulation between the plates during normal operation. The MATSCO/GE modifications to correct the DTS seal leakage and restraint problems, discussed in the previous two quarterly reports, were successful, since the DTS has subsequently operated through thirteen (13) tests without a recurrence of the problems. In addition, numerous equipment and operational improvements were made to the combustor and its support systems this quarter to make operation and maintenance more controllable, reliable, and safe. (ERA citation 05:036792)

COO-4094-81 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Lightning Strike at Bryan, Ohio.
B. E. Nichols. Feb 80, 19p
Contract AC02-76ET20279

A week before the 29 August 1979 dedication of the photovoltaic power system at daytime AM radio station WBNO, in Bryan, Ohio, a lightning superbolt struck the FM radio tower, one of two towers at the station. Minor damage to the station and to components of the photovoltaic system, the latter designed by MIT Lincoln Laboratory under US Department of Energy sponsorship, is described. This rare strike suggested the need for increased protection and more voltage-transient suppressors were added to those already in place as a preventive measure in the event that such a phenomenon reoccurs. (ERA citation 05:036449)

COO-4881-16 PC **A03**/MF **A01**
Prototech Co., Newton Highlands, MA.
Energy Savings by Means of Fuel Cell Electrodes in Electro-Chemical Industries. Progress Report, November 1, 1979-January 31, 1980.
A. Bar-Ilan, W. Juda, R. J. Allen, and R. W. Lindstrom. 18 Apr 80, 42p
Contract AC02-78ET25309

Zinc electrowinning data, obtained with hydrogen depolarized anodes operating in a plant feed electrolyte at 55 exp 0 C, are presented in this quarterly report for investigations involving the following: performance of an anode containing a low platinum loading, i.e. 0.09 mg/cm exp 2 instead of the typical 0.33 mg/cm exp 2 , and an anode catalyzed with palladium instead of platinum; establishment of a feed and bleed system to maintain a constant electrolyte composition; exploratory experiments on the effect of the rate and mode of electrolyte flow on the quality of the zinc plate at high current densities; performance of the anode with feeds of varying degrees of purification pre-treatment, and containing either 50 or 150 g/l Zn exp ++ ; the effect upon cell voltage of decreasing the hydrogen flowrate to the anode by dilution of the feed gas with nitrogen; the effect upon cell voltage of increasing the back pressure of the hydrogen gas fed to the anode; the effect upon energy consumption and current efficiency of varying the current density and the Zn exp ++ concentration; trace elemental analysis of a cathodic zinc plate of commercial-size thickness, as produced using the catalytic H sub 2 anode; further comparison of the effects of feed solution purification; and performance of four different Prototech Pt anodes. (ERA citation 05:036844)

DOE/CH/00178-T3 PC **A02**/MF **A01**
Monosolar, Inc., Santa Monica, CA.
Emerging Materials for Solar Cell Applications: Electrodeposited CdTe. First Quarter Report, February 15-May 15, 1980.
R. L. Rod, B. Basol, and O. Stafsudd. 30 Jun 80, 17p
Contract AC02-77CH00178

The present program is a continuation of earlier efforts to develop electrochemically deposited films of compound semiconductors and solar cells made from them. Primary objectives include the development and characterization of controllably doped n and p type CdTe films with densities of 5.8 gm/cm exp 3 , appropriate grain sizes, good film morphology and freedom from pinholes, and carrier concentrations from 10 exp 16 to 10 exp 18 /cm exp 3 . The end result of the effort is to demonstrate by the seventh month, or September 15, 1980, solar cells over 1 cm exp 2 in area showing total area conversion efficiencies exceeding 4%. By the end of the first quarter, milestones were met calling for us to supply characterized n type CdTe films that were reproducible and free from pinholes. Also, prototype electrodeposited CdTe solar cells were fabricated and evaluated. Characterizations of p-type CdTe and ZnTe films were complicated by interferences existing between them and adjacent substrates. A number of devices, including the glass/ITO/n-CdTe:In/Au Schottky structure and an ITO/n-CdTe:In/p-Cu/sub 2-x/Te heterojunction, have been fabricated. The highest internal efficiency of the Schottky devices, which have yet to have fingered grids and anti-reflection coatings applied, is 4%. The heterojunction is a larger area device 2 cm exp 2 in area. It shows promise of meeting the 4% total area efficiency as does the Schottky when grids and A/R coatings are applied. (ERA citation 05:036298)

DOE/CS/32522-T1 PC **A16**/MF **A01**
PRC Energy Analysis Co., McLean, VA.
Solar Photovoltaic Applications Seminar: Design, Installation and Operation of Small, Stand-Alone Photovoltaic Power Systems.
Jul 80, 351p
Contract AC01-77CS32522

This seminar material was developed primarily to provide solar photovoltaic (PV) applied engineering technology to the Federal community. An introduction to photoconductivity, semiconductors, and solar photovoltaic cells is included along with a demonstration of specific applications and application identification. The seminar details general systems design and incorporates most known information from industry, academia, and Government concerning small solar cell power system design engineering, presented in a practical and applied manner. Solar PV power system applications involve classical direct electrical energy conversion and electric power system analysis and synthesis. Presentations and examples involve a variety of disciplines including structural analysis, electric power and load analysis, reliability, sizing and optimization; and, installation, operation and maintenance. Four specific system designs are demonstrated: water pumping, domestic uses, navigational and aircraft aids, and telecommunications. All of the applications discussed are for small power requirement (under 2 kilowatts), stand-alone systems to be used in remote locations. Also presented are practical lessons gained from currently installed and operating systems, problems at sites and their resolution, a logical progression through each major phase of system acquisition, as well as thorough design reviews for each application. (ERA citation 05:036450)

DOE/EIA/06242-T1 PC **A06**/MF **A01**
SysteMetrics, Inc., Blacksburg, VA.
Capacity-Expansion Planning under Uncertainty in the Electric-Utility Industry.
A. L. Soyster. 25 Jul 80, 103p
Contract AC01-78ET06242

This document basically represents a comparison between theory and practice of capacity-expansion planning in the electric-utility industry. The purpose of the comparison is to provide avenues for further exploration in utility decision making. The focus of the Phase II study is upon the role of uncertainty in the decision-making process. The Phase I effort was directed at modeling the Averch-Johnson theory of the regulated utility. Part I of this report reviews the Anderson study (D. Anderson, Models for Determining Least-Cost Investments in Electricity Supply). The Anderson paper has become a standard reference for capacity-planning studies in the electric-utility industry. Part II examines uncertainty and the behavior of the firm. Part III reviews 5 models of electric-utility capacity planning under uncertainty, and Part IV is concerned with capacity-planning models in practice. (ERA citation 05:035047)

DOE/ER-0069 PC **A07**/MF **A01**
Argonne National Lab., IL.
Environmental Assessment for the Satellite Power System (SPS) Concept Development and Evaluation Program (CDEP).
A. R. Valentino. Aug 80, 128p
Contract W-31-109-ENG-38

In the satellite power system (SPS), satellites in geosynchronous earth orbit would collect solar energy in space, convert it to microwaves, and transmit the microwaves to receiving antennas (rectennas) on earth. At the rectennas, the microwave energy would be converted to electricity. This SPS environmental assessment considers the microwave and nonmicrowave effects on the terrestrial environment and human health, atmospheric effects, and effects on electromagnetic systems. No environmental problem has been identified that would preclude the continued study of SPS technology. To increase the certainty of the assessment, some research has been initiated and long-term research is being planned. (ERA citation 05:037248)

DOE/ER/10041-02 PC **A05**/MF **A01**
PRC Energy Analysis Co., McLean, VA.
Study of Federal Microwave Standards.
L. David. Aug 80, 84p
Contract AC01-79ER10041

Present and future federal regulatory processes which may impact the permissible levels of microwave radiation emitted by the SPS Microwave Power Transmission (MPTS) were studied. An historical development of US occupational and public microwave standards includes an overview of Western and East European philosophies of environmental protection and neurophysiology which have led to the current widely differing maximum permissible exposure limits to microwaves. The possible convergence of microwave standards is characterized by a lowering of Western exposure levels while Eastern countries consider standard relaxation. A trend toward stricter controls on activities perceived as harmful to public health is under way as is interest in improving the federal regulatory process. Particularly relevant to SPS is the initiation of long-term, low-level microwave exposure programs. Coupled with new developments in instrumentation and dosimetry, the results from chronic exposure program and population exposure studies could be expected within the next five to ten years. Also discussed is the increasing public concern that rf energy is yet another hazardous environmental agent. (ERA citation 05:037249)

DOE/ET/10815-46 PC **A04**/MF **A01**
Tennessee Univ. Space Inst., Tullahoma.
MHD Coal-Fired Flow Facility. Quarterly/Annual Technical Progress Report, October-December 1979.
J. B. Dicks, J. N. Chapman, and L. W. Crawford.
Feb 80, 68p
Contracts AC02-79ET10815, AC01-76ET1075

In this Fourth Quarterly/Annual Report submitted under DOE contracts EX-76-C-01-1760 and DE-AC02-79ET10815, the University of Tennessee Space Institute (UTSI) reports on significant activity, task status, planned research, testing, and development, and conclusions for the Magnetohydrodynamics (MHD) Coal-Fired Flow Facility (CFFF) and the Research and Development Laboratory. Work on the CFFF progressed with only minor problems. Total construction activity for all site work presently awarded is nearly 98% complete. Water analysis shows that Woods Reservoir baseline conditions are within EPA or Tennessee drinking water standards. For the primary combustor, the vitiation heater and primary combustor fabrication drawings were completed and the nozzle design was completed. The drum module for the radiant slagging furnace was awarded. On the MHD Power Generator, development continued in several areas of advanced analysis including development of time-dependent models for use with the one-dimensional code. For seed regeneration, the tentative determination is that the Tomlinson Tampella is the most economically viable method. With regard to capped electrode erosion, investigations have shown that the major degradation of the cladding still present is at the leading edge of the capped anode. To alleviate this, plans are to hot work the noble metal in the bending operation. In resolving another problem, a system employing the modified line-reversal method has been assembled and successfully tested to measure absolute plasma temperatures. (ERA citation 05:036781)

DOE/ET/10816-T1(V.1) PC **A14**/MF **A01**
Montana Energy and MHD Research and Development Inst., Inc., Butte.
MHD Power Generation: Research, Development and Engineering. Annual Progress Report, October 1977-September 1978.
1978, 305p
Contract AC07-78ET10816

Separate abstracts were prepared for the seven sections included in this volume. (ERA citation 05:036782)

DOE/ET/10816-T1(V.2) PC **A12**/MF **A01**
Montana Energy and MHD Research and Development Inst., Inc., Butte.
MHD Power Generation: Research, Development and Engineering. Annual Progress Report, October 1977-September 1978.
1978, 258p
Contract AC07-78ET10816

Separate abstracts were prepared for the six sections in this volume. (ERA citation 05:036785)

DOE/ET/17019-2 PC **A08**/MF **A01**
General Electric Co., Schenectady, NY. Energy Systems Programs Dept.
Development of Molten Carbonate Fuel Cell Power Plant. Quarterly Technical Progress Report, May 1-July 31, 1980.
J. R. Peterson. 4 Sep 80, 172p
Contract AC02-80ET17019

The major objective of this program for development of a molten carbonate fuel cell power plant is to establish and demonstrate readiness for fabrication and test of full-scale prototype stacks. This will be accomplished by a heavy emphasis upon resolution of remaining technology problems, including materials, processes and contaminant effects research, development and testing of cell components to 10,000 hours endurance life and scaleup of laboratory hardware to commercial size. A detailed design for a prototype stack will be defined and a tenth-size of full-scale cells will be tested. Component and manufacturing processes will be developed based upon commercial cost goals. Coal-fired utility central station and industrial cogeneration power plant requirements will be defined and plant options evaluated, leading to selection of a single reference design. Cell and stack design and development will be guided by requirements based upon the reference plant design. The specific program objectives derived from the contract work statement are as follows: (1) to define a reference power plant design for a coal-fired molten carbonate power plant; (2) to develop and verify cell and stack design based upon the requirements of the reference power plant design; (3) to establish and demonstrate readiness to fabricate and test full-length stacks of full-scale cells, hereafter called prototype stacks; and (4) to quantify contaminant effects and establish a program to verify performance of molten carbonate fuel cells operating on products of coal gasification. Progress is reported. (ERA citation 05:036801)

DOE/ET/20355-79/4 PC **A03**/MF **A01**
Georgia Inst. of Tech., Atlanta. School of Geophysical Sciences.
Computer Model for Large Arrays of Wind Turbines.
C. G. Justus, and A. S. Mikhail. May 79, 46p
RLD-2439-79/4
Contract AS06-76ET20355

A synthesis of the earlier studies of wind and power distributions for large arrays of wind turbines is formulated in a computer model program. The program can be run with interactive (computer terminal) or batch input (card files, etc.). Based on a

generic wind turbine power model, input characteristics at a single representative site, and data specifying the size of the array to be simulated, the program computes wind speed and wind power output statistics for the model array. Wind data for the input single site can be at 10 m level or at hub height (if the former, a height projection to hub height is performed by the program). Time series wind speeds at the single input site can also be used by the program to evaluate equivalent time-series wind speeds and output powers for the array. A program listing and input/output documentation are included. (ERA citation 05:036603)

DOE/ET/21038-1(V.1) PC **A03**/MF **A01**
Martin Marietta Aerospace, Denver, CO. Denver Div.
Solar Central Receiver Hybrid Power System, Phase I. Volume 1. Executive Summary. Final Technical Report, October 1978-August 1979.
Sep 79, 34p
Contract ET-78-C-03-2234

The Martin Marietta team has conducted system analyses and conceptual designs of hybrid systems employing molten salt (60% NaNO sub 3 , 40% KNO sub 3) heat transfer/storage media using a solar central receiver and a fossil-fired nonsolar energy source (coal, oil or gas). System- and subsystem-level analyses were performed to develop preferred system configurations using various amounts of solar storage capacities and fossil fuels. The various systems in this report are based on a technical approach that promotes higher conversion efficiencies, greater operational flexibility, and lower net energy costs than first generation water/steam receiver technology. In fact, the analysis shows that in the 1990 time frame, hybrid and solar standalone power systems based on molten salt technology are competitive with peaking, intermediate and baseload conventional power technology. The hybrid plant consists of solar and nonsolar portions of the plant that operate in parallel. For the solar portion of the plant, molten salt is heated in cavity receivers and delivered to salt storage tanks. The hot salt is used to generate steam for the turbine in salt heat exchangers. For the nonsolar portion of the plant, molten salt is heated in a fossil-fired salt heater and delivered to the salt storage tanks. The large quantities of storage and associated heliostats result in large plant capacity factors (0.75) from the solar portion of the plant, minimize the busbar energy costs, permit nonsolar subsystems less than the plant rating and minimize the amount of fossil fuel burned. An executive summary of the selection of the preferred system configuration, conceptual design, assessment of the commercial plant, and development plan is presented. (ERA citation 05:036454)

DOE/ET/23008-T1 PC **A05**/MF **A01**
Monosolar, Inc., Santa Monica, CA.
Emerging Materials for Solar Cell Applications: Electrodeposited CdTe. Final Report, February 14, 1979-February 14, 1980.
R. L. Rod, R. Bunshah, O. Stafsudd, B. M. Basol, and P. Nath. 15 May 80, 80p
Contract AC04-79ET23008

Thin film gold/polycrystalline cadmium telluride Schottky solar cells made by electrodepositing the semiconductor on an ITO-coated glass substrate serving also as an ohmic contact demonstrated an internal efficiency of 4% over 2 mm exp 2 areas. During the year being reported upon, Monosolar devoted mator attention to refining the electroplating process and determining the parameters governing CdTe film stoichiometry, grain size, substrate adhesion, and quality. UCLA acting as a Monosolar sub-contractor characterized both the CdTe films themselves and solar cells made from them. Techniques were developed for making measurements on films often less than 1 micron in thickness. The highest values achieved for efficiency parameters, not necessarily all in the same cell, were V/sub oc/ = 0.5 V, J/sub sc/ = 11 mA/cm exp 2 , and fill factor = 0.55 before corrections in the absence of anti-reflection coatings. Typical resistivities for n-CdTe films were 10 exp 5 omega - cm. Lifetimes of about 10 exp -10 sec were measured. Absorption coefficient of these films is in the order of 10 exp 4 for lambda < 0.7 mu m. Measured energy gap for these CdTe films is 1.55 eV, sightly higher than the 1.45 eV value for single crystal CdTe. The activation energy of the dominating trap level is 0.55 eV. Trap density is in the order of 10 exp 16 /cm exp 3 . Schottky diodes were of excellent quality and pinhole-free. The measured barrier height varied between 0.75 and 0.85 eV. Rectification ratios of 10 exp 4 were obtained reproducibly. Films measure about 1 inch square. Indications are that larger and more efficient low cost solar devices can readily be obtained soon using the techniques developed in this program. (ERA citation 05:036299)

DOE/JPL-1012-44 PC **A17**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Progress Report 15, December 1979-April 1980, and Proceedings of the Fifteenth Project Integration Meeting.
1980, 388p JPL-PUB-80-27, CONF-8004116-
Contract AI01-76ET20356
15. low-cost solar array project intergration meeting, Pasadena, CA, USA, 2 Apr 1980.

Progress made by the Low-Cost Solar Array Project during the period December 1979 to April 1980 is reported. Reports on project analysis and integration; technology development in silicon material, large-area silicon sheet and encapsulation; production process and equipment development; engineering; and operations are included. Also, a report on, and copies of visual presentations made at, the Project Integration Meeting held April 2 and 3, 1980, are included. (ERA citation 05:036301)

DOE/JPL/954343-80/20 PC **A03**/MF **A01**
Lamar Univ., Beaumont, TX. Dept. of Chemical Engineering.
Process Feasibility Study in Support of Silicon Material Task 1. Quarterly Technical Progress Report (XX), June 1-August 31, 1980.
C. L. Yaws, and K. Y. Li. Sep 80, 37p
Contract NAS-7-100-954343

Analyses of process system properties were continued for chemical materials important in the production of silicon including compilation and collection activities of the property data for use in the final report. Major efforts in chemical engineering analysis centered on the DCS process - Case A which involves production of dichlorosilane (DCS) as a silicon source material for polysilicon production in the Hemlock Semiconductor Corporation program. The preliminary process design of a plant to produce DCS was completed including process flowsheet (100%), base case conditions (100%), reaction chemistry (100%), raw materials (100%), utilities (100%), major process equipment (100%) and production labor (100%). The process design package was forwarded for economic analysis. Economic analysis of the DCS process - Case A was completed during this reporting period. The results for dichlorosilane (DCS) indicated a total product cost without profit of 1.29 $/kg (1980 dollars). This product cost without profit includes direct manufacturing cost, indirect manufacturing cost, plant overhead and general expenses. The sales price of DCS at 15% DCF rate of return on investment is 1.47$/kg (1980 dollars). Additional results are reported for sales price of dichlorosilane at various profitability levels as measured by ROI (return on original investment) and DCF (discounted cash flow rate of return). (ERA citation 05:036302)

DOE/JPL/955270-80/2 PC **A03**/MF **A01**
Kayex Corp., Rochester, NY.
Low Cost Czochralski Crystal Growing Technology: Near Term Implementation of the Flat Plate Photovoltaic Cost Reduction of the Low Cost Solar Array Project. Fifth Quarterly Progress Report, April 1-June 30, 1980.
E. G. Roberts. 1980, 31p
Contract NAS-7-100-955270

During this reporting period, the primary activity has been to develop microprocessor control of the crystal growth process and to develop and demonstrate the accelerated crystal growth program. Accelerated recharging of the quartz crucible by the RF melting of polycrystalline silicon feed rods was deemphasized by JPL primarily due to the unavailability of suitable quality feed rods at an effective economical price. The development of the cold crucible program as an alternative method of crucible recharging was continued, but at a lower priority. Work continued on the accelerated crystal growth program. Crystal growth runs were made utilizing the water cooled work coil previously used in the RF polycrystalline silicon rod melting program. Accelerated growth rates were demonstrated but an oxide build-up on the cold surface of the work coil, resulting in heavy flaking and consequent falling of oxide into the melt, resulted in abandoning this approach and redesigning, evaluating, and demonstrating an alternative heat sink arrangement. All necessary parts were received for the cold crucible premelter and system was assembled and interfaced to the multiturn high voltage RF power supply. (ERA citation 05:036303)

DOE/JPL/955567-80/2 PC **A05**/MF **A01**
Spectrolab, Inc., Sylmar, CA.
Design, Analysis, and Test Verification of Advanced Encapsulation System. Triannual Report for Period Ending 30 July 1980.
A. Garcia, C. Minning, and C. Perrygo. Aug 80, 84p
Contract NAS-7-100-955567

An optical model has been developed which will predict the amount of incident sunlight reaching the cell surface as well as determining the heat absorbed in encapsulation layers above the cells in a given module design. These results can be factored into a thermal model which will predict the NOCT of a given design. An electrical analysis has been performed which will aid in the selection of properly sized (for thickness) layers in a given module design. Differing allowable voltages may be integrated into the model. Work has begun on the structural model using the MSC NASTRAN finite element model computer program. An algorithm has been developed for determining the total system life-cycle energy cost for ranking module systems. (ERA citation 05:036304)

DOE/NASA/0049-80/1 PC **A05**/MF **A01**
Motorola, Inc., Phoenix, AZ.
Market Definition Study of Photovoltaic Power for Remote Villages in the United States.
C. Ragsdale. Feb 80, 76p NASA-CR-159800
Contract AI01-76ET20485

A grass roots evaluation of the market potential for photovoltaic applications in remote villages in the US and its territories provides an estimate of almost 14 MWp available for conversion from a potential to a real market. This total power potential is based on the energy needs of almost 400 sites reported by federal agencies and inputs from over 100 Indian tribes. This potential consists of the following: US government agencies-3000 KWp; Indian villages-10,000 KWp; Alaskan villages-370 KWp; territories-500 KWp; and US commercial-negligible. The report details the methodology used, the results achieved, and some recommendations of how to convert this domestic market potential into a real market and its contribution to preparing for the really large village power market potential that exists in developing countries. (ERA citation 05:034677)

DOE/PE-03871-01 PC **A24**/MF **A01**
Little (Arthur D.), Inc., Cambridge, MA.
Distributed Energy Systems: A Review of Related Technologies.
Nov 79, 558p
Contract EX-76-C-10-3871

Twenty-three papers were presented at the meeting. A separate abstract was prepared for each paper. (ERA citation 05:036638)

DOE/SF/10534-1 PC **A15**/MF **A01**
Martin Marietta Aerospace, Denver, CO.
Alternate Central Receiver Power System. Phase II. Midterm Topical Report.
Mar 80, 327p
Contract AC03-79SF10534

The objective of the Phase II program is to prove the feasibility of the molten salt central receiver power system by conducting a series of experiments and using results to update the commercial system developed during Phase I. The experiments are (1) Receiver Subsystem Research Experiment (SRE), (2) long-term molten salt flow loop, and (3) materials test program. The primary objectives of the receiver SRE are: (1) to demonstrate the safe, reliable, and efficient operation of a

solar receiver using molten salt (60% NaNO sub 3 , 40% KNO sub 3) as the heat transfer fluid under operating conditions that simulate a commercial receiver, including fluid temperatures, heat flux, realistic transients (start-up, shutdown, and cloud interruption), and steady-state operation; and (2) to demonstrate the fabrication processes and quality control techniques required for a commercial receiver. The primary objectives of the molten salt loop are: (1) to determine if there is any significant mass transport of material that could effect the life of a molten salt system; (2) to determine if corrosion rates in a flowing system differ significantly from those in static tests; (3) to establish the chemical stability of molten salt in a system with flow and temperature excursions; and (4) to gain more experience in the design, construction and operation of molten salt systems. The primary objective of the materials test program is to provide materials test data needed to commercialize a solar power plant using molten salt. (ERA citation 05:036460)

DOE/SF/10535-1/1 PC **A10**/MF **A01**
General Electric Co., Schenectady, NY. Energy Systems Programs Dept.
Alternate Central Receiver Power System Program. Phase II. Volume I. Commercial Plant Design Refinement. Midterm Technical Report.
Jul 80, 220p
Contract AC03-79SF10535

Results of a study to refine the Phase I conceptual design of a 100 MWe sodium cooled central receiver power plant to incorporate improvements in performance and cost are presented in detail. Topics include a solar receiver panel configuration analysis, receiver flow control system cost reduction, storage subsystem design improvements, operating mode analysis, system annual performance analysis, refined conceptual design, and refined plant cost estimate. Appendices include (a) receiver loss analysis code (PANELGR2), (b) PANELGR2 output for selected grouping scheme, (c) component cooldown analysis (initial uniform temperature), (d) component cooldown analysis (initial nonuniform temperature), (e) temperature cycling considerations in the downcomer pipe, (f) trickle flow scheme for short term standby, and (g) computer program listing for system annual performance analysis. (ERA citation 05:036461)

DOE/SF/10535-1/2 PC **A14**/MF **A01**
General Electric Co., Schenectady, NY. Energy Systems Programs Dept.
Alternate Central Receiver Power System Program. Phase II. Volume II. Sodium Test Receiver Experiment. Midtern Technical Report.
Jul 80, 304p
Contract AC03-79SF10535

Progress on the design of a commercial scale (100 MWe) sodium cooled central receiver power plant is reported. This volume of the Phase II report describes the design status, analysis results, and fabrication status of the 2.5 MWth Sodium Receiver Test Assembly (SRTA). The absorber test panel design and fabrication, the sodium loop design and fabrication, the preliminary test plan, and the preliminary safety evaluation are described in detail. (ERA citation 05:036462)

DOE/SF/10535-1/3 PC **A06**/MF **A01**
General Electric Co., Schenectady, NY. Energy Systems Programs Dept.
Alternate Central Receiver Power System Program. Phase II.
Jul 80, 101p
Contract AC03-79SF10535

Progress on the design of a 100 MWe sodium-cooled central receiver power plant is reported. This volume describes the materials experiments. The development project was performed to provide a technique/procedure for the furnace brazing of thin walled tubular Incoloy 800 absorber panels for sodium cooled solar central receiver plants, with an immediate objective of providing a tecnique for the brazing/fabrication of a test panel scheduled for solar testing at the Central Receiver Test Facility in Albuquerque, N.M. in late 1980 and early 1981. This development included selection of a brazing filler metal type, form and application procedure; determination of a joint design that would result in good brazability and mechanical properties; and the selection of an appropriate panel brazing procedure, atmosphere control, orientation and fixturing method in a brazing furnace. Over 100 test specimens were fabricated and brazed. The results of this work were demonstrated by the successful brazing of 122 cm (4 foot long), ten tube wide absorber panel segments. Procedures and results are detailed. (ERA citation 05:036463)

EPRI-CS-1432 PC **A99**/MF **A01**
Center for Occupational Research and Development, Waco, TX.
Resource Handbook for Power Plant Training Programs. Research Project 1266-6.
D. M. Hull, and B. F. Rinard. Aug 80, 608p

This Resource Handbook represents an initial attempt to catalog available training material which is relevant to coal-fired power plant job categories. Introductory sections provide background information and guidance for using the handbook. Material specifically related to the jobs of Instrument and Control Technician, Environmental and Chemical Analysis Technician, and Power Plant Operator is categorized as Printed Material, Audio/Visual Aids, and Specialty and Packaged Programs. Other sections of the Handbook list organizations supplying material for review, sources having information retrieval capabilities, and professional and trade associations. (ERA citation 05:035053)

EPRI-CS-1512 PC **A07**/MF **A01**
Energy Research and Consultants Corp., Morrisville, PA.
Recommended Design Guidelines for Feedwater Pumps in Large Power Generating Units. Final Report.
E. Makay, and O. Szamody. Sep 80, 145p

Guidelines are provided to assist in the specification and procurement of feed water pumps, especially boiler feed pumps for large (over 600 MW) fossil-fuel-fired plant. However, the material is also applicable to circulating pumps for nuclear steam generators and to other feed water pump applications. The purpose is to make available guidance and conclusions based on the best available information on feed water pumps, with emphasis on design and performance requirements necessary to avoid or minimize many frequently-observed problems. Pro-forma language for specification provisions needed to implement this purpose is provided together with related technical discussions of pump problems and their roots in design, manufacture, and operation. Questionnaires are provided to aid the preparation of specifications and the evaluation of vendor proposals. The technical scope includes design and materials, pump characteristics, bearings and critical speeds, seals, axial-balancing devices, and couplings, as well as testing, recirculation requirements, and component life expectancy. The need is stressed for designing pumps for reliable performance, even at the cost of some efficiency at the best efficiency point. It is also essential to design for stable opeation over a wide range of conditions, as many fossil-fuel plants are likely to be subject to cyclic operation at some future time. (ERA citation 05:036614)

EPRI-EL-1424(V.4) PC **A06**/MF **A01**
NEI Parsons Ltd., Newcastle-upon-Tyne (England).
Determination of Synchronous Machine Stability Study Constants. Final Report.
K. Jenkins, B. Wharmby, J. S. Heard, V. R. Pulle, and B. J. White. Aug 80, 109p

The broad objectives of Research Project 997-1 covered: (1) the experimental determination of turbine generator parameters in a manufacturer's works and in power stations; and (2) the development of generator model structures for system stability calculations and their subsequent validation by comparison with system stability tests. The method used to measure parameters over a range of frequencies at standstill on four generators (rated at 200, 250, 500, and 680 MW) in a manufacturer's works and the development of models from those measurements are described. Comparison showed that a model derived from standstill frequency response tests has improved accuracy over a model using design data (Kilgore's theory) in predicting peak values and damping rates for power flow and field current response. The standstill frequency response method has advantages for both manufacturers and utilities, particularly in regard to low cost and short test duration. (ERA citation 05:036615)

EPRI-NP-1520 PC **A05**/MF **A01**
Holmes and Narver, Inc., Orange, CA.
Basic National Data System for Power Plants.
E. B. Cleveland, R. H. Gauger, S. C. Hall, T. J. Thurkow, and R. H. Koppe. Sep 80, 85p

This report defines the scope of data requirements for a proposed National Data System. Needs of the electric-power industry for plant- and equipment-performance data to support critical decisions are defined. These decisions are in the areas of system planning, design of new power plants, operating-plant performance, and equipment improvements. Various indices and descriptive combinations are defined to translate these data needs into data-element requirements. The scope of the data element requirements are categorized as Design (Pedigree) Data, Unit Performance Data, Outage and Derating Data, and Component Data. Recognizing the variability in system and unit size, an optimum level of data reporting is defined. This is accomplished in a manner that provides the widest range of data on a national basis while minimizing the impact upon individual utilities. The scope of data requirements described may be considered to be cost-effective. (ERA citation 05:036771)

ERC-R-80025 PC **A08**/MF **A01**
Arizona State Univ., Tempe. School of Engineering.
Terrestrial Photovoltaic Power Systems with Sunlight Concentration. Annual Progress Report, 1979.
C. E. Backus, and B. D. Wood. Jun 80, 155p
Contract AC04-76DP00789

Cell testing procedures at ASU have been improved to increase the confidence in the test results as well as the development of techniques to improve cell mounting. A combined theoretical and experimental investigation was made of the effects of nonuniformity of illumination on the electrical performance of solar cells. Various illumination profiles were experimentally imposed on the cell and electrical performance evaluated. In general it has been shown the effect of nonuniform illumination on the efficiency of the solar cell depends on the type of profile and location relative to busbar and grid fingers. A separate theoretical and experimental investigation was made of the effects of nonuniform temperature profiles in concentrator cells. These variations of temperature can occur under high concentrations if there are imperfections in the bond between the concentrator cell and its cooled substrate. A computer model was developed to predict solar cell performance under nonuniform temperature operation and experiments were performed on commercially available concentrator solar cells to validate model predictions. The magnitude of temperature nonuniformities caused by voids in the solar cell solder bond increases as the cell thickness decreases and intensity increases. Computer algorithms were developed to evaluate the performance characteristics of combined photovoltaic-thermal (PV-T) solar collectors. This work emphasizes flat plate PV-T collectors but attention was also given to a detailed model for concentrating collectors. As expected, the extended fin geometries induce a greater degree of air turbulence and thus improves the fluid thermal conductance for a given mass flow rate. In general, the more turbulence generated by the duct, the greater the thermal output for a given flow rate. Results are presented in detail. (ERA citation 05:036305)

FCR-0926(V.1) PC **A11**/MF **A01**
United Technologies Corp., South Windsor, CT. Power Systems Div.
Evaluation of Battery Converters Based on 4.8-MW Fuel Cell Demonstrator Inverter. Final Report.
F. J. Kornbrust, J. R. Vivirito, J. W. Walton, and J. M. King. 1978, 228p
Contract AC01-76ET26961

Electrical power conditioning is a critical element in the development of advanced electrochemical

energy storage systems. This program evaluates the use of existing self-commutated converter technology (as developed by the Power Systems Division of United Technologies for the 4.8-MW Fuel Cell Demonstrator) with modification for use in battery energy storage systems. The program consists of three parts: evaluation of the cost and performance of a self-commutated converter modified to maintain production commonality between battery and fuel cell power conditioners; demonstration of the principal characteristics required for the battery application in MW-scale hardware; and investigation of the technical requirements of operation isolated from the utility system. A power-conditioning system consisting of a self-commutated converter augmented with a phase-controlled rectifier was selected and a preliminary design prepared. A principal factor in this selection was production commonality with the fuel cell inverter system. Additional types of augmentation, and the use of a self-commutated converter system without augmentation, were also considered. A survey of advanced battery manufacturers was used to establish the dc interface characteristics. The principal characteristics of self-commutated converter operation required for battery application were demonstrated using an available 0.5-MW development system. A survey of five REA and municipal utilities and three A and E firms was conducted to determine technical requirements for operation in a mode isolated from the utility. Definitive requirements for this application were not established because of the limited scope of this study. (ERA citation 05:036804)

FE-2357-63 PC **A03**/MF **A01**
General Electric Co., Schenectady, NY. Energy Systems Programs Dept.
PFB Coal Fired Combined Cycle Development Program. Quarterly Report, October-December 1979.
1979, 44p
Contract AC01-76ET10377

During the past quarter, prime attention has been directed toward fulfilling the overall objectives of the 10 x 100 hour test performed in Leatherhead, England. The overall test specimen exposure goal of 1000 hours has been attained. Initial visual examination of the specimens revealed no evidence of erosion for either the cooled specimen (1350 exp 0 F metal) or uncooled specimen (1475 exp 0 F metal). The 1000 hour clad/coated airfoil test at Exxon is also complete. Preliminary results indicate CoCrAlY and FeCrAlY suffered the least erosion. Metal temperatures were 1550 exp 0 F. Cold flow experiments with the Air Shield cyclone model during the past several months have shown that the measured efficiency of this unit is substantially superior to the reported grade efficiency for the (industry standard) Stairmand high-flow cyclone design. This higher efficiency persists even when the dirty flow is injected into what is intended to be the clean air shield adjacent to the exhaust duct. Since the Air Shield cyclone is similar in many respects to the Stairmand high-flow cyclone, its superior performance was initially surprising. Subsequent testing of a revamped Developmental Cyclone (modified to approximate the Stairmand design) confirmed the lower Stairmand performance. The superior dust penetration of the Air Shield model is attributed to: smaller outlet diameter, greater engagement length, and rounded corners at the scroll/body junction. Modifications to the Air Shield cyclone to incorporate a center electrode cage structure were completed. This design allows the application of a high voltage field to augment particle separation over the entire length of the cyclone. Conclusions drawn from these experiments with the Air Shield Cyclone are given. (ERA citation 05:036607)

HN-1540 PC **A11**/MF **A01**
Holmes and Narver, Inc., Orange, CA.
Feasibility Study: Fuel Cell Cogeneration at the Anheuser-Busch Los Angeles Brewery.
R. M. Banister, V. A. Corea, J. C. Sorensen, J. M. Duncan, and L. Rudawitz. Feb 80, 246p
Contract AC03-78CS40226

The results of a feasibility study undertaken in support of the overall Department of Energy (DOE) goal to develop fuel cell power plants for industrial cogeneration are described. Use of a single 4.5 MW fuel cell power plant like that manufactured by United Technologies Corporation (UTC) and currently being constructed on the Consolidated Edison of New York System was examined. The technical feasibility of using such a plant in a cogeneration mode at the Anheuser-Busch, Los Angeles brewery was affirmed by the study. Breakeven capital costs for UTC supplied equipment were calculated for various conditions. Based upon the assumption that UTC supplied equipment could be provided for the $350 to $400/kW projected for first generation fuel cells, the economic feasibility of fuel cell cogeneration was demonstrated for nearly all assumed conditions. The most economical case was found to be a municipal utility owned, base loaded power plant where economic credit is taken for reduced environmental emissions. Acceptable fuels were evaluated for their availability, and the fuels identified for use were natural gas with propane as a backup. Phosphoric acid is the selected electrolyte. The Demonstration Program Plan is described. (ERA citation 05:036803)

INIS-mf-5693 PC **A10**/MF **A01**
Battelle-Inst. e.V., Frankfurt am Main (Germany, F.R.).
Power Generation Costs. Coal - Nuclear Power. Comparing Investment and Operating Costs of Coal-Fired and Nuclear Power Plants. Supplement Volume.
1979, 224p
In German.
U.S. Sales Only.

This supplement volume contains 17 separate chapters investigating the parameters which determine power generation costs on the basis of coal and nuclear power and a comparison of these. A detailed calculation model is given. The complex nature of this type of cost comparison is shown by a review of selected parameter constellation for coal-fired and nuclear power plants. The most favourable method of power generation can only be determined if all parameters are viewed together. One quite important parameter is the load factor, or rather the hours of operation. (UA) 891 UA/UA 892 AMO. (Atomindex citation 11:526093)

LMSC-D-766341 PC **A04**/MF **A01**
Lockheed Palo Alto Research Labs., CA.
Cadmium Sulfide/Copper Sulfide Heterojunction Cell Research. Final Report, February 26, 1979-May 31, 1980.
W. W. Anderson, and A. D. Jonath. Jun 80, 68p
Contract AC02-77CH00178

Several all-sputter-deposited Cu sub 2 S/CdS cells have been prepared to date with J/sub SC/ approx. = 3 mA/cm exp 2 under simulated AM 1 illumination. The best AM 1 conversion efficiency obtained is 0.6%. This is typical of sputtered CdS in Cu sub 2 S/CdS cells investigated to date. The sputtered Cu sub 2 S appears to be satisfactory for solar cell applications. Present evidence indicates that the poor conversion efficiency is due to a low-junction electric field intensity on the CdS side of the heterojunction. A multilayedr CdS structure has been developed which may allow the tailoring of the junction electric field intensity to a selected high value to obtain high-junction collection efficiency. Hybrid process cells consisting of sputter-deposited CdS with conventional dry processed Cu sub 2 S were also prepared. The best of these cells exhibited a short-circuit current density of 6.9 mA/cm exp 2 and a conversion efficiency of 1.18%. (ERA citation 05:036306)

N81-10301/2 PC **A11**/MF **A01**
TRW Defense and Space Systems Group, Redondo Beach, CA. Power Conversion Electronics Dept.
Application Handbook for a Standardized Control Module (Scm) for DC-DC Converters, Volume 1.
Final Report, Jun. 1976 - Jan. 1980.
F. C. Lee, M. F. Mahmoud, and Y. Yu. Apr 80, 240p NASA-CR-165172, TRW-29922-6001-RU-01
Contract NAS3-20102
2. Prepared in Cooperation with Virginia Polytechnic Inst. And State Univ., Blacksburg.

The standardized control module (SCM) was developed for application in the buck, boost and buck/boost DC-DC converters. The SCM used multiple feedback loops to provide improved input line and output load regulation, stable feedback control system, good dynamic transient response and adaptive compensation of the control loop for changes in open loop gain and output filter time constraints. The necessary modeling and analysis tools to aid the design engineer in the application of the SCM to DC-DC Converters were developed. The SCM functional block diagram and the different analysis techniques were examined. The average time domain analysis technique was chosen as the basic analytical tool. The power stage transfer functions were developed for the buck, boost and buck/boost converters. The analog signal and digital signal processor transfer functions were developed for the three DC-DC Converter types using the constant on time, constant off time and constant frequency control laws.

N81-10517/3 PC **A09**/MF **A01**
United Technologies Corp., South Windsor, CT. Power Systems Div.
Cogeneration Technology Alternatives Study (CTAS) Volume 5: Analytical Approach and Results.
Final Report.
Jan 80, 176p NASA-CR-159763, DOE/NASA/0030-80/5
Contracts DEN3-30, EC-77-A-31-1062

Data and information in the area of advanced energy conversion systems for industrial cogeneration applications in the 1985 to 2000 time period are provided. Six current and thirty-six advanced energy conversion systems were defined and combined with appropriate balance of plant equipment. Twenty-six industrial processes were selected from among the high energy consuming industries to serve as a framework for the study. Each conversion system was analyzed as a cogenerator with each industrial plant. Fuel consumption, costs, and environmental intrusion were evaluated and compared to corresponding traditional values. Various cogeneration strategies were analyzed and both topping and bottoming (using industrial by-product heat) applications were included. The advanced energy conversion technologies indicated reduced fuel consumption, costs, and emissions. Typically fuel energy savings of 10 to 25 percent were predicted compared to traditional on site furnaces and utility electricity. Gas turbines and combined cycles indicated high overall annual cost savings. Steam turbines and gas turbines produced high estimated returns. In some applications, diesels were most efficient. The advanced technologies used coal derived fuels, or coal with advanced fluid bed combustion or on site gasification systems.

ORNL/TM-6252 PC **A04**/MF **A01**
Oak Ridge National Lab., TN.
Summary of the Development of Open-Cycle Gas Turbine-Steam Cycles.
M. E. Lackey, and A. S. Thompson. Sep 80, 69p
Contract W-7405-ENG-26

Combined-cycle plants employing gas turbine cycles superimposed on conventional steam plants are well developed. Nearly 200 units are operating in the US on clean fuels (natural gas or distillate fuel oils) and giving overall thermal efficiencies as high as 42%. Future plants will have to use coal or coal-derived fuels, and this presents problems because gas turbines are very sensitive to particulates and contaminants in the fuel such as sulfur, potassium, lead, etc. If clean liquid or high-Btu gaseous fuels are made from coal, it appears that the conversion efficiency will be no more than 67%. Thus, the overall efficiency of utilization of coal would be less than if it were burned in a conventional steam plant unless the permissible gas turbine inlet temperature can be increased to approx. 1500 exp 0 C (2732 exp 0 F). Coupling a combined-cycle power plant directly to a low-Btu coal gasifier increases the fuel conversion efficiency and permits salvaging waste heat from the gasifier for feedwater heating in the steam cycle. By using a gas turbine inlet temperature of 1315 exp 0 C (2400 exp 0 F), well above the current maximum of approx. 1040 exp 0 C (1904 exp 0 F), an overall efficiency of approx. 40% has been estimated for the integrated plant. However, as discussed in companion reports, it is doubtful that operation with gas turbine inlet temperatures above 1100 exp 0 C (2012 exp 0 F) will prove practicable in base-load plants. (ERA citation 05:036608)

PB81-116949 Not available NTIS
National Bureau of Standards, Washington, DC.
Electrical Conductivity Mechanisms in Iron-Containing Slags.
W. R. Hosler, G. S. White, and T. Negas. 1980, 6p
Sponsored in part by Department of Energy, Washington, DC.
Pub. in Proceedings of the International Conference on MHD Electrical Power Generation (7th) Held at Cambridge, MA. on June 16-20, 1980, p220-225 1980.

Understanding the electrical conductivity of coal slags of various compositions and the effect of current transport on the underlying materials at conditions found in an MHD generator channel is essential to the success of a generating power system. A unique method for determining the electrical conductivity of coal slag has been developed which eliminates the errors usually encountered due to surface oxidation or reduction and slag creep over the sides of the boat or slag container. Slag conductivities at high temperatures (above 1400C) are independent of oxygen pressure and of seed content up to amounts likely to be incorporated in the slag in an operating channel. The lack of O2 pressure dependence of the conductivity implies that the iron ion charge ratio is also not a dominant factor in the conductivity magnitude at high temperature.

PB81-117244 PC **A05**/MF **A01**
Resource Analysis, Inc., Waltham, MA.
Analysis Barriers to Improving the Hydroelectric Power Interface with Electric Power Systems.
Final rept.
30 Sep 80, 95p W81-00121, OWRT-C-90237-T(9625)(1)
Contract DI-14-34-0001-9625

The analysis barriers to improving the interface of hydroelectric power with electric power systems are investigated and discussed. The value of hydropower to society and the utilities is explored touching on the problems of weather and hydrological dependencies, multiple-use conflicts and engineering aspects. Special attention is afforded to the organizational structure of the electric utility industry and the operational and planning functions as they relate to hydroelectric power production. Analytical approaches taken to optimize the use of hydropower over time are surveyed. Current barriers to these approaches are presented along with future research topics which potentially may alleviate them.

PB81-800401 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Silicon Solar Cells. November, 1978-October, 1979 (Citations from the Engineering Index Data Base).
Rept. for Nov 78-Oct 79,
George Reimherr. Nov 80, 177p
Supersedes PB80-800717, and NTIS/PS-78/1116. See also 1970-1975, NTIS/PS-77/0957, and 1976-October, 1978, PB80-800709.

Worldwide research on the development of solar energy conversion devices using silicon ribbons, sheets, films, crystals, and wafers is cited. The preparation, purity, crystal defects, and efficiency of these cells are covered. The economics of solar cell development is discussed. The effects of radiation and weathering on performance are included. (Contains 171 citations.)

PB81-800419 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Silicon Solar Cells. November, 1979-October, 1980 (Citations from the Engineering Index Data Base).
Rept. for Nov 79-Oct 80,
George Reimherr. Nov 80, 169p
Supersedes PB80-800717, and NTIS/PS-78/1116. See also 1970-1975, NTIS/PS-77/0957, 1976-October, 1978, PB80-800709, and November, 1978-October, 1979, PB81-800401.

Worldwide research on the development of solar energy conversion devices using silicon ribbons, sheets, films, crystals, and wafers is cited. The preparation, purity, crystal defects, and efficiency of these cells are covered. The economics of solar cell development is discussed. The effects of radiation and weathering on performance are included. (This updated bibliography contains 162 citations, all of which are new entries to the previous edition.)

PB81-800435 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Silicon Solar Cells. November, 1979-October, 1980 (Citations from the NTIS Data Base).
Rept. for Nov 79-Oct 80,
George W. Reimherr. Nov 80, 166p
Supersedes PB80-800691, and NTIS/PS-78/1115. See also 1964-September 1970, NTIS/PS-77/0955, 1976-November 1977, NTIS/PS-78/1114, and December 1977-October 1979, PB81-800435.

Citations of Government-sponsored research reports on silicon solar cell growth and fabrication are presented. Processes covered include chemical vapor deposition, the Czochralski method, dendritic growth, ribbon growth, epitaxial growth, and silicon sheet fabrication on substrates. Silicon compound synthesis, purification, and reduction are discussed. Casting, cutting, and shaping of silicon solar cells are included. Solar energy conversion efficiency and performance are described. Abstracts on costs and production of these cells are covered. (This updated bibliography contains 159 citations, all of which are new entries to the previous edition.)

PB81-800443 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Silicon Solar Cells. December, 1977-October, 1979 (Citations from the NTIS Data Base).
Rept. for Dec 77-Oct 79,
Brian Carrigan. Nov 80, 291p
See also 1964-September 1976, NTIS/PS-77/0955, and 1976-November 1977, NTIS/PS-78/1114.

Citations of Government-sponsored research reports on silicon solar cell growth and fabrication are presented. Processes covered include chemical vapor deposition, the Czochralski method, dendritis growth, ribbon growth, epitaxial growth, and silicon sheet fabrication on substrates. Silicon compound snthesis, purification, and reduction are discussed. Casting, cutting, and shaping of silicon solar cells are included. Solar energy conversion efficiency and performance are described. Abstracts on costs and production of these cells are covered. (This updated bibliography contains 284 citations, 75 of which are new entries to the previous edition.)

PNL-SA-7840 PC **A02**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
DOE Candidate Site Meteorological Measurement Program.
D. S. Renne, and W. F. Sandusky. Jan 80, 10p
CONF-7909167-1
Contract AC06-76RL01830
IEA expert meeting, Boone, NC, USA, 26 Sep 1979.

In March 1976, DOE issued an RFP to acquire, on a competitive basis, a group of candidate sites, proposed by utilities interested in the field testing program. A total of 17 candidate sites were selected from the 64 proposals submitted in response to the RFP. From these sites, five have been chosen thus far to receive turbines for field testing. This paper discusses the meteorological measurement activities at these sites and provides details of the measurement program as it exists in late 1979. In addition, the paper briefly discusses the directions this program will take in the near future, and the options interested electric service organizations have for participating in the program. (ERA citation 05:034864)

PNL-4000(V.3) PC **A07**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Assessment of Solar Options for Small Power Systems Applications. Volume III. Analysis of Concepts.
W. W. Laity, D. T. Aase, W. J. Apley, S. P. Bird, and M. K. Drost. Sep 80, 136p
Contract AC06-76RL01830

A comparative analysis of solar thermal conversion concepts that are potentially suitable for development as small electric power systems (1 to 10 MWe) is given. Seven generic types of collectors, together with associated subsystems for electric power generation, were considered. The collectors can be classified into three categories: (1) two-axis tracking (with compound-curvature reflecting surfaces; (2) one-axis tracking (with single-curvature reflecting suraces; and (3) nontracking (with low-concentration reflecting surfaces). All seven collectors were analyzed in conceptual system configurations with Rankine-cycle engines. In addition, two of the collectors (the Point Focus Central Receiver and the Point Focus Distributed Receiver) were analyzed with Brayton-cycle engines, and the latter of the two also was analyzed with Stirling-cycle engines. This volume describes the systems analyses performed on all the alternative configurations of the seven generic collector concepts and the results obtained. The SOLSTEP computer code used to determine each configuration's system cost and performance is briefly described. The collector and receiver performance calculations used are also presented. The capital investment and related costs that were obtained from the systems studies are presented, and the levelized energy costs are given as a function of capacity factor obtained from the systems studies. Included also are the values of the other attributes used in the concepts' final ranking. The comments, conclusions, and recommendations developed by the PNL study team during the concept characterization and systems analysis tasks of the study are presented. (ERA citation 05:036456)

PNL-4000(V.4) PC **A04**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Assessment of Solar Options for Small Power Systems Applications. Volume IV. Comparative Ranking of Concepts.
J. W. Currie, and M. Jannol. Jul 80, 70p
Contract AC06-76RL01830

A comparative analysis of solar thermal conversion concepts that are potentially suitable for development as small electric power systems (1 to 10 MWe) is presented. Cogeneration and total energy systems were beyond the scope of this study. Seven generic type of collectors, together with associated subsystems for electric power generation, were considered. The collectors can be classified into three categories: (1) two-axis tracking (with compound-curvature reflecting surfaces); (2) one-axis tracking (with single-curvature reflecting surfaces; and (3) nontracking (with low-concentration reflecting surfaces). All seven collectors were analyzed in conceptual system configurations with Rankine-cycle engines. In addition, two of the collectors (the Point Focus Central Receiver and the Point Focus Distributed Receiver) were analyzed with Brayton-cycle engines, and the latter of the two also was analyzed with Stirling-cycle engines. With these engine options, 10 systems were formulated for analysis. This is the fourth volume of a five-volume report on the work performed to analyze the alternative concepts, and the results obtained. Included in this volume are descriptions of the methodology used with, and concept ranks obtained from, potential users and R and D fund allocators. (ERA citation 05:036457)

PNL-4000(V.5) PC **A05**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Assessment of Solar Options for Small Power Systems Applications. Volume V. SOLSTEP: a Computer Model for Solar Plant System Simulations.
S. P. Bird. Sep 80, 95p
Contract AC06-76RL01830

The simulation code, SOLSTEP, was developed at the Pacific Northwest Laboratory to facilitate the evaluation of proposed designs for solar thermal power plants. It allows the user to analyze the thermodynamic and economic performance of a conceptual design for several field size-storage capacity configurations. This feature makes it possible to study the levelized energy cost of a proposed concept over a range of plant capacity factors. The thermodynamic performance is analyzed on a time step basis using actual recorded meteorological

and insolation data for specific geographic locations. The flexibility of the model enables the user to analyze both central and distributed generation concepts using either thermal or electric storage systems. The thermodynamic and economic analyses view the plant in a macroscopic manner as a combination of component subsystems. In the thermodynamic simulation, concentrator optical performance is modeled as a function of solar position; other aspects of collector performance can optionally be treated as functions of ambient air temperature, wind speed, and component power level. The power conversion model accounts for the effects of ambient air temperature, partial load operation, auxiliary power demands, and plant standby and startup energy requirements. The code was designed in a modular fashion to provide efficient evaluations of the collector system, total plant, and system economics. SOLSTEP has been used to analyze a variety of solar thermal generic concepts involving several collector types and energy conversion and storage subsystems. The code's straightforward models and modular nature facilitated simple and inexpensive parametric studies of solar thermal power plant performance. (ERA citation 05:036458)

SAND-79-7057 PC **A08**/MF **A01**
Bechtel National, Inc., San Francisco, CA. Research and Engineering.
Wind Design of Flat Panel Photovoltaic Array Structures. Final Report.
Jun 80, 174p
Contract AC04-76DP00789

Bechtel National, Inc., has conducted a study of feasible low-cost structures for solar photovoltaic central power plants. Wind load magnitudes for these arrays significantly influence structural costs. Wind load prediction is hampered by the lack of specific information for these unique structures. Accordingly, a wind-tunnel test program was completed at the Fluid Dynamics Laboratory of Colorado State University, Fort Collins, Colorado. This testing gave wind force coefficients for single or large-field photovoltaic arrays and the resulting design criteria are reported. The test program was a limited effort to advance the state of the art and further work is recommended. (ERA citation 05:036452)

SAND-80-0475C PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Torque Ripple in a Darrieus, Vertical Axis Wind Turbine.
R. C. Reuter, Jr. 1980, 17p CONF-801102-3
Contract AC04-76DP00789
ASME winter annual meeting, Chicago, IL, USA, 16 Nov 1980.

Interaction between a steady wind and a rotating, Darrieus, vertical axis wind turbine produces time periodic aerodynamic loads which cause time dependent torque variations, referred to as torque ripple, to occur in the mechanical link between the turbine and the electrical generator. There is concern for the effect of torque ripple upon fatigue life of drive train components and upon power quality. An analytical solution characterizing the phenomenon of torque ripple has been obtained which is based upon a Fourier expansion of the time dependent features of the problem. Numerical results for torque ripple, some experimental data, determination of acceptable levels and methods of controlling it, are presented and discussed. (ERA citation 05:036601)

SAND-80-7060 PC **A10**/MF **A01**
McDonnell Douglas Astronautics Co., Huntington Beach, CA.
Solar Total Energy Modularity Study.
Aug 80, 203p
Contract AC04-76DP00789

This is the final report of the McDonnell Douglas Astronautics Company's work on the Solar Total Energy Modularity Study. It presents the results of a 26-month study which included the survey of industrial sites to obtain site-specific energy demand data and other information pertinent to designing solar total energy systems for the sites. Solar systems, using single-axis tracking parabolic-trough solar collectors were designed for each of the sites to the depth necessary to verify feasibility and identify major system components. Cost and performance estimates for each of the systems were estimated and used to predict internal rate of return over a range of collector cost and performance. Parametric system and component performance data are presented along with solar insolation data for all the Sol-Met data stations which allows the rapid assessment of solar system feasibility for future potential industrial users. (ERA citation 05:034705)

SERI/PR-0-8254-3 PC **A05**/MF **A01**
RCA Labs., Princeton, NJ.
Amorphous Thin Films for Solar-Cell Applications. Quarterly Report No. 3, 11 March-10 June 1980.
D. E. Carlson, R. S. Crandall, J. Dresner, B. Goldstein, and J. J. Hanak. Jun 80, 76p
Contract AC02-77CH00178

A research program on hydrogenated amorphous silicon (a-Si:H) and the a-Si:H solar cell is described that includes six research tasks: theoretical modeling, deposition and doping studies, experimental methods for the characterization of a-Si:H, formation of solar-cell structures, theoretical and experimental evaluation of solar-cell parameters, and an investigation of stacked junction cells. Progress is reported in detail. (ERA citation 05:036308)

SERI/PR-8081-1-T1 PC **A02**/MF **A01**
Varian Associates, Inc., Palo Alto, CA.
Materials for High Efficiency Monolothic Multigap Concentrator Solar Cells. Quarterly Report No. 4, January 1-March 31, 1980.
1980, 25p
Contract AC02-77CH00178

The objectives of this work are to develop a materials technology of the AlGaInAs and AlInAsSb mixed crystal systems. These technologies are directed towards the development of a two-gap, monolithic, lattice-matched concentrator cell with 28% or higher AM2 conversion efficiency at 500 to 1000 suns. The work to be performed is subdivided into the five major tasks: (1) develop and demonstrate the technology for a grading layer of GaInAs/GaAs and low-bandgap cells in AlGaInAs/GaInAs/GaAs; (2) develop and demonstrate inter-cell tunnel junction contacts in the higher bandgap AlGaInAs alloys; (3) develop and demonstrate technology for a higher bandgap concentrator cell in AlGaInAs alloys; (4) demonstrate a complete two-gap monolithic concentrator cell with Am2 efficiency of 28% or more; and (5) investigate the potential of AlInAsSb alloys grown on InAs substrates. Progress is reported. (ERA citation 05:036310)

SERI/TP-631-664 PC **A02**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Analysis of the Mist Lift Process for Mist Flow Open-Cycle OTEC.
R. L. Davenport. Jun 80, 10p CONF-801102-24
Contract AC02-77CH00178
ASME winter annual meeting, Chicago, IL, USA, 16 Nov 1980.

Preliminary results are presented of a numerical analysis to study the open-cycle mist flow process for ocean thermal energy conversion (OTEC). Emphasis in the analysis is on the mass transfer and fluid mechanics of the steady-state mist flow. The analysis is based on two one-dimensional models of the mist lift process: a single-group model describes a mist composed of a single size of drops and a multigroup model considers a spectrum of drop sizes. The single-group model predicts that the lift achieved in the mist lift process will be sensitive to the inlet parameters. Under conditions that lead to maximum lift in the model for a single drop size, the multigroup model predicts significantly reduced performance. Because the growth of drops is important, sensitivity of the predicted performance of the mist lift to variations in the collision parameters has been studied. (ERA citation 05:036466)

SERI/TR-8033-2-T1 PC **A04**/MF **A01**
TELIC Corp., Santa Monica, CA.
Cadmium Sulfide/Copper Sulfide Heterojunction Cell Research. Final Report, February 26, 1979-July 15, 1980.
J. A. Thornton, and D. G. Cornog. 30 Jun 80, 64p
Contract AC02-77CH00178

Extensive modifications were made to the multisource deposition apparatus. These include the installation of a larger vacuum chamber on the existing system. The new chamber provides improved inter-source shielding, an improved substrate mounting and heating system, and a vacuum interlock for introducing substrates. CdS resistivity control by both In doping and off-stoichiometric deposition has been investigated. Indium doping has been achieved both by diffusion from a pre-deposited In layer and by using In doped sputtering targets. Resistivities in the range 0.1 to 5 omega -cm have been obtained for target doping levels of from 0.1 to 1 at. percent of In. These resistivities were found to be critically dependent on the H sub 2 S injection rate, apparently because of compensation by Cd vacancies. Off-stoichiometry CdS coatings with solar-illuminated resistivities of about 10 exp 2 omega -cm have been deposited, using a cyclic reactive sputtering process were the H sub 2 S injection is periodically switched on and off. The Cu/sub x/S deposition process was found to be sensitive to the period of cathode operation prior to coating deposition, probably because of the conditioning of cathode and shield surfaces. All-sputter-deposited Cd(Zn)S/Cu sub 2 S cells, with Cd(Zn)S layers deposited using a Cd-0.10 Zn target doped with 2 atomic percent In, have yielded efficiencies of approx. 0.4%. All-sputtered cells with efficiencies of approx. 0.6% have been fabricated, using undoped CdS deposited by the pulse injection process. Efficiencies of approx. 1.2% have been achieved for cells with undoped sputter-deposited CdS and CuCl dry processed Cu sub 2 S. (ERA citation 05:036311)

TE-4258/4247-126-80 PC **A05**/MF **A01**
Thermo Electron Corp., Waltham, MA.
DOE/JPL Advanced Thermionic Technology Program. Progress Report No. 41.
Dec 79, 81p
Contract AC02-76ET11292

The primary long-term goal of the DOE effort is to improve TEC performance to the level that thermionic topping of fossil fuel steam powerplants becomes technically possible and economically attractive. An intermediate goal is to demonstrate an in-boiler thermionic module in the early 1980's. A short-term goal is the demonstration of the reliability of thermionic operation in a combustion environment. The focus of the JPL program is to develop thermionic conversion technology appropriate for nuclear electric propulsion (NEP) missions. These missions require operation at collector temperatures substantially higher than those associated with terrestrial applications. The DOE and JPL tasks for developing thermionic energy conversion (TEC) are complementary and synergistic. Converter performance improvement is an area in which one agency's program supports the effort of the other. Progress in the DOE program is reported including: (1) demonstration of over 3600 hours of stable operation (Quarter Scale Silicon Carbide Converter No. 1) in a combustion environment at emitter temperatures at, or above, 1600 exp 0 K; (2) calculation of a complete current density-voltage characteristics in the power quadrant which includes both double valued sheath effects at the emitter and the spatial distribution of electron temperature in the interelectrode plasma; and (3) successful operation of Converter No. 222 with a cesium-graphite reservoir. JPL program accomplishments reported include: (1) performance data have been obtained on three planar variable spaced converters with molybdenum emitters (Converter Nos. 223, 227 and 228); and (2) system calculations indicate that long term thermionic performance demonstrated at Thermo Electron should yield a power system specific mass less than 22 kg/kWe. (ERA citation 05:036800)

UCID-18772 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Small Hydroelectric Power Development in China.
F. R. Skidmore. Aug 80, 18p
Contract W-7405-ENG-48

The small hydroelectric development in China is extensive, with more than 90,000 units, but represents a very small resource in terms of total elec-

tricity generation (or as little as 4%). In the rural areas, however, small hydro is an important tool for modernization and represents a substantial percentage (30%) of the electricity. Its characteristics - simplicity, reliability, and low cost are ideal for isolated underdeveloped areas. Good turbine design is largely an empirical science. The Chinese experience in developing technology for for a large variety of operating conditions has provided an empirical basis for good designs. Their small turbines and accompanying control mechanisms thus appear to be competitive in the American market. It is not obvious that other technology, especially on the electrical side, has advantages for the American market. It appears that the Chinese emphasis on small hydroelectric development, in parallel with large central development, will continue in the future. Technical development, especially in the small standardized turbine area, should continue as well. (ERA citation 05:034624)

UCRL-84042 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Driving Parallel Flashlamps with a Compensated Pulsed Alternator.
B. M. Carder, B. T. Merritt, W. L. Gagnon, W. L. Bird, and W. F. Weldon. 30 May 80, 20p CONF-800640-18
Contract W-7405-48
14. pulse power modulator symposium, Orlando, FL, USA, 3 Jun 1980.

Test results are given for a prototype Compensated Pulsed Alternator that was operated up to its 5400 rpm design speed. The machine has delivered approximately 140 kilojoules of energy in a single 1.3 millisecond pulse into a load comprising sixteen parallel flashlamps. The energy delivered to the lamps follows a W = (rpm/225) exp 4 scaling law to about 4200 rpm. Beyond that speed, eddy current losses become significant with the present design. New codes are able to model the machine parameters, and the prototype is presently being rebuilt to reduce the high speed losses predicted by the codes and verified by experiment. (ERA citation 05:037435)

10C. Energy Storage

DOE/NASA/0100-79/1 PC **A05**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
High Temperature Thermal Energy Storage in Steel and Sand.
R. H. Turner. 15 Dec 79, 94p
Contract AI01-77CS51040

The technical and economic potential for high temperature (343 exp 0 C, 650 exp 0 F) thermal energy storage (TES) in hollow steel ingots, pipes embedded in concrete, and for pipes buried in sand is evaluated. The intended TES application is integration into a steam power plant, perhaps to provide an otherwise baseload plant. It was determined that concrete would separate from pipes due to thermal stresses, causing unacceptable thermal resistances. Therefore, for study, concrete was replaced by sand, which is free from thermal stresses. The original hollow steel ingot concept underwent a series of evolutionary changes, and it was finally decided that all variations were not cost effective compared to the sand-pipe approach. Therefore, the sand-pipe thermal storage unit (TSU) was evaluated in depth to assess the approximate tube spacing requirements consistent with different system performance characteristics and also attendant system costs. A series of performance cost curves were generated from which tube spacing and tube diameter performance comparisons were obtained. The curves served as inputs for the cost analysis. The major conclusion of the study is that for large TSUs which do not require fast response times, the sand-pipe approach offers attractive possibilities. A pipe diameter about 9 cm (3.5 in) and pipe spacing of approximately 25 cm (10 in), with sand filling the interspaces, appears appropriate. Such a TSU system designed for 8 hours charge/discharge cycle has an energy unit storage cost (C/sub E/) of $2.63/kWhr-t and a power unit storage cost (C/sub P/) of $42/kW-t (in 1977 dollars). (ERA citation 05:036705)

LBL-10208 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Seasonal Thermal Energy Storage in Aquifers: Mathematical Modeling Studies in 1979.
C. F. Tsang. Nov 79, 17p
Contract W-7405-ENG-48

During fiscal year 1979 (October 1978-September 1979) major LBL work involved the numerical modeling of the recently completed hot water storage field experiments at Auburn University. Work was also done, under separate funding, on the basic understanding of thermal stratification dispersion, and buoyancy flow in an aquifer used for hot or cold water storage. These questions are crucial in determining the efficiency of aquifer storage and will be discussed elsewhere. The results of the simulation of Auburn field experiments are summarized. (ERA citation 05:036707)

N81-10563/7 PC **A02**/MF **A01**
Societe Nationale Industrielle Aerospatiale, Les Mureaux (France). Div. Systemes Balistiques et Spatiaux.
High Speed Flywheels Operating on One Active Axis Magnetic Bearings.
P. C. Poubeau. 1979, 11p SNIAS-792-422-107
Presented at 1977 Flywheels Technol. Symp., San Francisco, 5-7 Oct. 1977.

The configurations of two momentum wheel were examined: one design for high angular momentum for a low mass, and the other utilizing two center rotating wheels. Several engineering models were built constituting small units able to store energy under kinetic form with input and output of power under electric form. The successful operation of these models demonstrated the compatibility for energy storage systems of high speed rotors with a magnetic suspension. The characteristics of the magnetic suspension and of the rotors which were developed are described.

PAT-APPL-6-134 855 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Toroidal Cell and Battery.
Patent Application,
W. J. Nagle. Filed 28 Mar 80, 13p N80-33857/7, NASA-CASE-LEW-12918-1
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A toroidal cell is disclosed which includes a wound core disposed within a pair of toroidal channel shaped electrodes separated by nylon insulator. The shape of the case electrodes of this cell allows one doughnut shaped surface and the inner cylindrical case wall to be used as an electrode and a second planar doughnut shaped surface and the outer cylindrical case wall to be used as another electrode. Connectors may be used to stack two or more toroidal cells together by connecting the entire surface area of the electrode of one cell to the entire surface area of the electrode of a second cell. The central cavity of each toroidal cell may be used as a conduit for pumping a fluid through the toroidal cell to thereby cool the cell.

PB81-123689 PC **A05**/MF **A01**
Indian Lead Zinc Information Centre, New Delhi.
Proceedings of the Symposium on Battery Systems in the 80s Held in New Delhi, India on February 26, 1979.
Nov 80, 85p

A symposium on 'Battery Systems in the 80s' was held in New Delhi on 26th February 1979, with the objective of systematically presenting not only the status of the battery industry in the country but also to make a realistic assessment of the emerging trends in battery technology. While acknowledged experts in the fields of lead and lead acid batteries from India and abroad presented papers covering comprehensively the different aspects of battery systems, the participants were senior executives, technologists and government officials from user and producer interests. Representing the producer interests were the producers of lead and zinc and battery manufacturers. The symposium afforded an opportunity for not only exchange of information but also for cross-fertilization of ideas.

SERI/PR-631-636 PC **A02**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Solar Energy Storage Program: FY79 Annual Report.
C. E. Wyman, R. J. Copeland, J. D. Wright, and F. Baylin. May 80, 12p
Contract AC02-77CH00178

This report summarizes the SERI Solar Energy Storage Program, which made a strong start in FY79. In support of the joint DOE Thermal Energy Storage for Solar Thermal plan, a ranking methodology was developed in the Thermal Storage Requirements Task for selection of thermal energy storage technologies for solar thermal applications. The ranking is based on cost and performance data, and a request for proposals was written in FY79 to be used in competitive selection of a subcontractor to generate this data. Also, thermal storage value data based on costs of alternative energy systems were generated for electric power plants and will be used for cost goals as a preliminary thermal storage screening tool. In the future, this task will provide support to key decision points in the joint multiyear program plan. In the Thermal Storage Development Task, a survey was completed of thermal energy storage technologies, projects, and economics. An analysis was then made of latent heat storage for solar heating based on previous system simulations. The only major advantage shown for latent heat storage is a reduced storage volume and not the improved solar system performance frequently postulated. Therefore, latent heat storage must be competitively priced with sensuible heat options. Direct contact latent heat storage offers satisfactory low-cost potential and has additional merit in that the concept could be used for a wide range of temperatures. (ERA citation 05:034758)

UCRL-82937 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
High Density Energy Storage Capacitor.
K. Whitham, M. M. Howland, and J. R. Hutzler. 13 Nov 79, 5p CONF-791102-174
Contract W-7405-ENG-48
Symposium on engineering problems of fusion research, San Francisco, CA, USA, 13 Nov 1979.

The Nova laser system will use 130 MJ of capacitive energy storage and have a peak power capability of 250,000 MW. This capacitor bank is a significant portion of the laser cost and requires a large portion of the physical facilities. In order to reduce the cost and volume required by the bank, the Laser Fusion Program funded contracts with three energy storage capacitor producers: Aerovox, G.E., and Maxwell Laboratories, to develop higher energy density, lower cost energy storage capacitors. This paper describes the designs which resulted from the Aerovox development contract, and specifically addresses the design and initial life testing of a 12.5 kJ, 22 kV capacitor with a density of 4.2 J/in exp 3 and a projected cost in the range of 5 cents per joule. (ERA citation 05:037444)

11. MATERIALS

11A. Adhesives and Seals

CONF-800765-1 PC **A02**/MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Barium Silicate Glass/Inconel X-750 Interaction.
P. V. Kelsey, Jr., W. T. Siegel, and D. V. Miley. 1980, 11p
Contract AC07-76ID01570
LLR/MMRD international symposium of interfaces in glass-metal systems, Berkeley, CA, USA, 28 Jul 1980.

Water reactor safety programs at the Idaho National Engineering Laboratory have required the

development of specialized instrumentation. An example is the electrical conductivity-sensitive liquid level transducer developed for use in pressurized-water reactors (PWRs) in which the operation of the sensing probe relies upon the passage of current through the water between the center pin of the electrode and its shell such that when water is present the resulting voltage is low, and conversely, when water is absent the voltage is high. The transducer's ceramic seal is a hot-pressed glass ceramic; its metal housing is Inconel X-750. The ceramic material provides an essential dielectric barrier between the center pin and the outer housing. The operation of the probe as well as the integrity of the PWR environment requires a hermetically-bonded seal between the ceramic and the metal. However, during testing, an increasing number of probe assemblies failed owing to poor glass-to-metal seals as well as void formation within the ceramic. Therefore, a program was initiated to characterize the metallic surface with respect to pre-oxidation treatment and determine optimum conditions for wetting and bonding of the metal by the glass to obtain baseline data relevant to production of acceptable transducer seals. (ERA citation 05:034906)

11B. Ceramics, Refractories, and Glasses

AD-A091 365/7 Not available NTIS
California Univ., Los Angeles. Dept. of Physics.
Infrared-Transparent Glasses Derived from the Fluorides of Zirconium, Thorium, and Barium,
R. Braunstein, M. Robinson, R. C. Pastor, R. R. Turk, and D. P. Devor. 24 Mar 80, 9p ARO-14249.13-P
Grant DAAG29-79-G-0047
Availability: Pub. in Materials Research Bulletin, v15 n6 p735-742 1980 (No copies furnished by DTIC/NTIS).

No abstract available.

DOE/ER/02390-5 PC **A06**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Dept. of Materials Science and Engineering.
Basic Research in Crystalline and Noncrystalline Ceramic Systems. Annual Report, August 1, 1979-October 31, 1980.
1980, 101p
Contract AS02-76ER02390

The Basic Research Programs in Ceramics supports a significant fraction of the research effort and graduate student training in ceramics at M.I.T. The importance of basic research programs in ceramics processing and properties is becoming widely recognized as the critical role of improved ceramic materials for energy systems is acknowledged. The needs identified in the 1977 series of workshops on DOE programs in energy-related materials research and by the ongoing efforts of the DOE Council on Materials Science are being translated into the basic and applied research necessary to fulfill the established objectives in the effort to solve the nation's energy problems. Present indications are that ceramics in numerous applications will be critical in meeting national energy requirements. (ERA citation 05:036943)

PB81-104887 PC **A05**/MF **A01**
Sigri Elektrographit G.m.b.H., Meitingen (Germany, F.R.).
Entwicklung dichter Siliciumcarbid-Koerper fuer hochbeanspruchte Bauteile im Chemieapparatebau (Development of Impermeable High-Duty SiC-Bodies for Applications in Chemical Apparatuses),
Horst Boeder, and Ernst Freundlinger. Dec 79, 91p BMFT-FB-T-79-146
Also pub. as ISSN-0340-7608. Text in German, abstract in English.

Targets of this developing-work were impermeable SiC shapes for chemical apparatuses, because SiC recommends itself as a suitable material on account of its excellent corrosion-resistance and its good thermal and mechanical properties. As essential factors of influence the following properties have been studied: density, pore structure, carbon content before siliconizing and wall thickness; that means: all processing-steps must be investigated. It was found that SiC-shapes, which are tight against liquids and gases can be made by using special receipts and by additional impregnation-steps. The material contents a few percents of silicon filling remaining pores. Flexural strength up to 100 N/sq mm at 1500C was measured. Also good resistance to hot conc. hydrochloric acid and to sulfuric acid was found. Metallic silicon is attacked preferably. The good qualification of SiC for chemical apparatus is shown. Further possibilities of application are seen in the moulding and furnace-industry.

PB81-123663 Not available NTIS
National Bureau of Standards, Washington, DC.
In Situ Oxidation of Y2O3-Doped Si3N4.
Interim rept.
Sep 80, 3p
Sponsored in part by Department of Energy Washington, DC. See also report dated Aug 80, PB80-218191.
Pub. in Electron Microsc. 1980 4, p310-312 1980.

Specimens of Y2O3-doped Si3N4 were oxidized in an environmental cell in a 600 kV electron microscope. This ceramic oxidizes passively at temperatures greater than 1000C but oxidizes catastrophically at about 750C. The in situ experiments showed that oxidation occurs by nucleation and growth of SiO2 and Si2N2O on the beta Si3N4 surfaces and by volatization of W inclusions. The paper discusses the HUEM methodology and the oxidation results.

11C. Coating, Colorants, and Finishes

AD-A091 053/9 PC **A05**/MF **A01**
Pratt and Whitney Aircraft Group, West Palm Beach, FL. Government Products Div.
Wear Resistant Coatings for Titanium.
Final rept. 18 Sep 78-18 Sep 79,
P. L. McDaniel, and R. E. Fishter. Jul 80, 76p
Rept no. PWA-FR-12303
Contract N00019-78-C-0489

During this third program phase, an intensive investigation was conducted to further evaluate the effect of various pulse settings on the properties of the coatings produced. Variations in cathode efficiency, molybdenum content, surface morphology, and hardness were related to changes in these pulse settings. The effects of plating solution composition and temperature on these properties were also studied. The completion of this third phase has provided additional information on the properties of chromium-molybdenum coatings on both steel and titanium, singled out specific pulse settings and heat treatments as optimal for producing wear resistant coatings on various alloys, and established standards for the properties and uses of the plating. (Author)

AD-A091 083/6 PC **A03**/MF **A01**
Goodyear Aerospace Corp., Litchfield Park, AZ. Arizona Div.
Superhard Transparent Coating Optimization Program.
Final rept.,
Richard S. Hassard, Glenn E. Wintermute, and John Uram, Jr. Sep 80, 43p GERA-2448, USAAVRADCOM-TR-80-D-24
Contract DAAK51-79-C-0047

This report covers the results of a study program for the optimization of a hard transparent coating that was previously developed and laboratory tested by Goodyear Aerospace Corp. Subsequent field tests of the coating on UH-1 helicopter windows revealed certain deficiencies which this program was designed to overcome. Modifications of the No. 210 coating consisted primarily of discrete changes in the quantities of the reactive components. (Author)

11D. Composite Materials

AD-A091 025/7 PC **A08**/MF **A01**
Notre Dame Univ., IN. Dept. of Electrical Engineering.
Modeling and Modification of the Electromagnetic Properties of Advanced Composite Materials.
Final rept.,
W. J. Gajda, Jr., P. K. Ajmera, W. C. Strieder, Richard Kwor, and C. Araujo. 1980, 153p
AFOSR-TR-80-1071
Grant AFOSR-77-3453

The electromagnetic hazards involved in using composite materials in aircraft are considered. Attention is focused on the problems associated with the lower conductivities of composites in comparison to those of metals. The concept of a high conductivity composite is advanced as a solution to the electromagnetic problems associated with presently available composites. The electrical properties of available advanced composite materials, primarily graphite/epoxy and boron/epoxy, are presented. Basic deterministic models relating the electrical conductivities (D.C. to 50 MHz) of composites to the fiber conductivity, the matrix conductivity and the volume fraction of the fibers are developed. The electrical behavior of as-manufactured graphite and boron fibers is also detailed. The possibility of 'doping' fibers with suitable impurities to increase conductivity without an associated decrease in specific strength is explored. Boron fibers undergo a recrystallization when heated above 800 C and have, as a consequence, significantly reduced strengths. Since thermal diffusion of impurities requires temperatures above 800 C, significant effort was devoted to inhibiting this recrystallization. Diffusion of nickel impurities inhibited this process and resulted in increased conductivities.

AD-A091 028/1 PC **A08**/MF **A01**
General Dynamics Corp., Fort Worth, TX.
Time-Dependent Environmental Behavior of Graphite/Epoxy Composites.
Final technical rept. 1 Aug 77-31 Jan 80,
K. G. Kibler. May 80, 151p AFWAL-TR-80-4052
Contract F33615-77-C-5109

Experimental and analytical investigations have been conducted to determine the individual and combined effects of temperature and absorbed moisture on the time-dependent mechanical response of unidirectional and cross-plied graphite-epoxy composite. Tensile creep response was measured at room temperature and four elevated temperatures (up to the glass transition region of the materials) for dry specimens and for specimens moisture-saturated at 75% and 95% relative humidity. Results were obtained for two material systems: Narmco T300-5208 and Hercules AS/3502. The stress levels used were demonstrated to be within the range of linear viscoelastic response. Superposition techniques were used to determine compliance master curves from the results for individual temperature and moisture condition, and quasi-elastic conversion was employed to extract relaxation modules behavior. Expansional strains due to temperature and moisture were measured. From measured principal properties, laminate response was predicted using time-stepped elastic analyses for the environments considered. Analytical procedures for transient and nonuniform temperature and moisture conditions were formulated. An analytical method for minimizing residual stresses during cure was developed, and sample results for the present materials are presented. Observations and recommended resulting from these investigations are included in this final report. (Author)

N81-10112/3 PC **A04**/MF **A01**
TRW, Inc., Cleveland, OH. Materials Technology Lab.
Tungsten Wire-Reinforced Superalloys for 1093 C (2000 F) Turbine Blade Applications.
Final Report.
G. I. Friedman, and J. N. Fleck. Oct 79, 72p
NASA-CR-159720, TRW-ER-8135
Contract NAS3-20084

Various combinations of fiber and matrix materials were fabricated and evaluated for the purpose of

selecting a specific combination that exhibited the best overall properties for a turbine blade application. A total of seven matrix alloys, including Hastelloy X, Nimonic 80A, Inconel 600, Inconel 625, IN-102, FeCrA1Y, were investigated reinforced with either 218CS tungsten, or W-Hf-C fibers. Based on preliminary screening studies, FeCrA1Y, Inconel 600 and Inconel 625 matrix composites systems were selected for extended thermal cycle tests and for property evaluations which included stress rupture, impact, and oxidation resistance. Of those investigated, the FeCrA1Y matrix composite system exhibited the best overall properties required for a turbine blade application. The W-Hf-C/FeCrA1Y system was selected for further property evaluation. Tensile strength values of up to 724 MPa (105,000 psi) were obtained for this material at 982 C and 607 MPa at 1093 C.

11F. Metallurgy and Metallography

AD-A090 854/1 PC **A05**/MF **A01**
Pittsburgh Univ PA Dept of Metallurgical and Materials Engineering
Oxidation and Oxide Dispersion Strengthening of Copper-Titanium and Other Alloys.
Final rept.,
Gerald H. Meier. Oct 78, 88p Rept no. SETEC-MME-78-170
Contract N00014-75-C-0747

The kinetics of internal oxidation of dilute Cu-Ti alloys have been studied as a function of specimen geometry, temperature and Ti concentration. Rate equations based on the quasi-steady state approximation have been shown to describe the internal oxidation of both cylinders and spheres. Similar studies on planar Co-Ti alloys have shown multiple internal zones. Rate equations have been formulated for this case and shown to agree with experiments. The above measurements have provided data for the oxygen permeabilities in both Cu and Co. The particle size, crystal structure, and morphology of internal Ti oxides in Cu have been carefully investigated and the elevated temperature coarsening of TiO2 particles has been studied. The coarsening kinetics were found to be diffusion controlled but the rate of coarsening of TiO2 is much slower than for other oxides (e.g. SiO2) in Cu. The TiO2 dispersion effectively increases the yield strength of Cutitania alloys by a factor of five to ten over that of pure copper. Good correlation can be made between the yield strengths and the Orowan mechanism for dispersion strengthening. Alloys with Ti concentrations of 1 wt. pct or less are ductile (15 - 30% elongation). The combined mechanical properties (strengths and ductilities) of polycrystalline Cu-TiO2 alloys are comparable to the best values yet reported for dispersion strengthened copper. The combined effects of a TiO2 dispersion and Cr precipitates on the mechanical properties of Cu indicate a method for obtaining outstanding mechanical properties in Cu alloy systems. (Author)

AD-A090 896/2 PC **A03**/MF **A01**
Defence Research Establishment Pacific Victoria (British Columbia).
The Resistance of HY130 Steel to Environmental Cracking in Sea Water.
Materials rept.,
T. P. Nikiforuk, and J. A. H. Carson. Dec 78, 26p Rept no. DREP-78-E

The growing interest in high performance ships, such as hydrofoils, has necessitated a corresponding interest in high strength materials. These materials, which have a high strength to weight ratio, must meet specific requirements, such as ease of fabrication, high toughness at low temperatures, and good resistance to environmental cracking. While there are several types of alloys which can meet the requirements for strength, low temperature toughness, and ease of fabrication, the selection becomes much more limited when the resisiance to environmental cracking is considered. The first high performance ship in the Canadian Navy was the hydrofoil HMCS BRAS d'OR. The cracking that occurred in the 1700 MPa (250 ksi) Maraging Steel foils of this ship severely limited the evaluation of the hydrofoil concept. The cracking resulted from unexpectedly high residual welding stresses and a low resistance of the welded material to crack initiation under both the freely corroding and the cathodically protected conditions. (Author)

AD-A091 020/8 PC **A02**/MF **A01**
Northwestern Univ., Evanston, IL.
Grain Boundary Void Nucleation in Astroloy Produced by Room Temperature Deformation and Anneal.
T. Saegusa, M. Uemura, and J. R. Weertman. 26 Nov 79, 7p AFOSR-TR-80-0968
Grant AFOSR-77-3251
Pub. in Metallurgical Transactions A, v11A p1453-1458 Aug 80.

No abstract available.

AD-A091 021/6 PC **A02**/MF **A01**
Northwestern Univ., Evanston, IL. Dept. of Materials Science.
Dependence of Cyclic Plastic Work of Fatigue Crack Propagation on Delta K in MA87 Al P/M Alloy,
S. I. Kwun, and M. E. Fine. 9 Nov 79, 5p AFOSR-TR-80-0800
Grant AFOSR-78-3732
Pub. in Scripta Metallurgica, v14 p155-158 1980.

No abstract available.

AD-A091 067/9 PC **A02**/MF **A01**
Foreign Technology Div., Wright-Patterson AFB, OH.
Stainless Steels' Resistance to Hydroerosion,
V. M. Omel'chenko, S. L. Milichenko, and A. G. Aleksandrov. 30 Jul 80, 10p Rept no. FTD-ID(RS)T-0918-80
Edited trans. of Problemy Treniya i Iznashivaniya (USSR) n2 p111-115 1972, by John S. Fisher.

No abstract available.

AD-A091 106/5 PC **A03**/MF **A01**
Ship Structure Committee (NAS-NRC), Washington D C.
Investigation of Steels for Improved Weldability in Ship Construction. Phase I.
Interim rept.,
R. W. Vanderbeck. May 80, 35p Rept no. SSC-298

This report covers the first phase of a three-year study to select the optimum materials and welding parameters to improve resistance to degradation of the heat-affected-zone properties in weldments made with high-deposition-rate processes. Two production steels and twenty 500-pound laboratory heats of steels of varying chemical compositions reflecting low carbon and sulfur content, silicon-aluminum deoxidation practice, globular sulfides, fine titanium nitrides, and treatments with rare earth metals, boron and calcium have been recommended for further examination. (Author)

AD-A091 230/3 PC **A03**/MF **A01**
Dayton Univ., OH. Research Inst.
Surface Characterization of Chemically Etched Ti-8Al-1Mo-1Sn and Ti-13V-11Cr-3Al.
Final rept. Jun 79-Feb 80,
J. S. Solomon, A. A. Roche, and W. L. Baun. Aug 80, 43p AFWAL-TR-80-4105
Contract F33615-78-C-5102
Prepared in cooperation with Universal Energy Systems, Dayton, OH.

The effects of chemical treatments on surfaces of Ti8Al-1Mo-1Sn and Ti-13V-11Cr-3Al were characterized with Auger electron spectroscopy, ion scattering spectroscopy, secondary ion mass spectroscopy,and scanning electron microscopy. The effects of particular treatments were not always the same for each alloy. In all cases the original surface oxide was replaced with a new one containing traces of elemental species common to a particular treatment. In most cases the oxide formed was identified as TiO2. The oxide formed on Ti-8Al-1Mo-1Sn by a fluorophosphate treatment was an oxyfluoride of titanium. (Author)

AD-A091 305/3 PC **A04**/MF **A01**
AiResearch Mfg. Co. of Arizona, Phoenix.
Hot Isostatic Pressing/Heat Treatment of Cast Superalloy AF2-1DA, Radial Turbine Wheels.
Final rept. 6 May 75-15 Jul 79,
James R. Kidwell, David V. Sundberg, and Muneo Fujii. Jun 80, 56p 31-3292, AFWAL-TR-80-4076
Contract F33615-75-C-2016

Forty AF2-1DA alloy radial turbine wheels were cast and X-ray inspected. Thirty-eight wheels were free of obvious defects and selected for evaluation. As-cast elevated temperature tensile strength was measured and as-cast/heat threated tensile and stress-rupture properties were determined. Eight wheels were HIPped in four combinations with temperatures varying from 2150 to 2250 F, pressures of 15 or 29 ksi, and a constant three-hour time period. Four solution heat treatment temperatures were selected based on a previous investigation to cast a modified AF2-1DA alloy composition (AFML Contract Number F33615-71-C-1573). Evaluations were performed using four HIP conditions and eight HIP/heat treatment combinations of four wheels each. Samples were examined metallographically and tensile and stress-rupture properties were determined. Four HIP/heat treatment combinations were selected for LCF testing on the basis of acceptable microstructures and mechanical properties. Room temperature strain-control LCF tests were performed and results analyzed on a Weibull distribution. Data analysis indicated that LCF life improvement was obtained through HIP and heat treatment. Specifically, a 3X LCF life improvement was achieved for as-cast wheels predicted to fail in less than 1000 cycles. (Author)

AD-A091 345/9 PC **A02**/MF **A01**
Northwestern Univ., Evanston, IL. Dept. of Materials Science.
Thresholds for Fatigue Initiation and Propagation and Plastic Work in HY80 and HY130 Steels.
Annual rept. 1 Sep 79-31 Aug 80,
Morris E. Fine. 16 Oct 80, 14p
Contract N00014-78-C-0565

The effect of tempering temperature on the fatigue crack propagation rate (FCPR) in the mid-stress intensity range of HY130 austenitized at 815 C was determined. Three treatments giving the same hardness, R.C. 34, were selected: A - 10 hrs at 400 C, B - 5 hrs at 550 C, and C - 1/4 hr at 650 C. There was little difference in the rates either when the testing was done in air (55% relative humidity) or dry argon. Previously, a ten times larger FCPR was observed in specimens tempered 1 hr at 610 C when the tests were carried out in air rather than dry argon. Changing the tempering furnace from a salt pot to a dry argon tube furnace and water quenching from 610 C rather than air cooling seemed to cure the problem. The threshold for macrofatigue crack propagation was measured in commercially pure iron in both center notch and side notch specimens. Both specimen geometries have the same results, delta k(th) = 6 MN/sq root of m cubed. (Author)

AD-A091 390/5 PC **A03**/MF **A01**
Defence Research Establishment Pacific Victoria (British Columbia).
JIC Measurement Point Determinations for HY130, CMS-9, and inconel 718.
Materials rept.,
James R. Matthews, and Gerald D. West. Mar 80, 39p Rept no. DREP-80-A

Determination of the elastic-plastic fracture toughness for three medium strength materials of varying ductility has been carried out. The materials in decreasing ductility are HY130 Steel, CMS-9 Steel, and Inconel 718. A survey of measurement-point techniques for J sub Ic has been incorporated in the study to evaluate the effect of ductility on the determination of both an elastic-plastic fracture parameter and a fracture measure for direct estimation of the elastic fracture toughness K sub Ic. (Author)

CONF-8005109-1(Dr) PC **A04**/MF **A01**
Oak Ridge National Lab., TN.
Grain Boundary Segregation and Intergranular Failure.
C. L. White. 1980, 65p
Contracts W-7405-EN-26, AC05-76OR00
International Al-Li conference, Stone Mountain, GA, USA, 19 May 1980.

Trace elements and impurities often segregate strongly to grain boundaries in metals and alloys. Concentrations of these elements at grain boundaries are often 10 exp 3 to 10 exp 5 times as great as their overall concentration in the alloy. Because of such segregation, certain trace elements can exert a disproportionate influence on material properties. One frequently observed consequence of trace element segregation to grain boundaries is the occurrence of grain boundary failure and low ductility. Less well known are incidences of improved ductility and inhibition of grain boundary fracture resulting from trace element segregation to grain boundaries in certain systems. An overview of trace element segregation and intergranular failure in a variety of alloy systems as well as preliminary results from studies on Al 3% Li will be presented. (ERA citation 05:035149)

CONF-800744-7(Dr) PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Evidence of Surface Migration and Formation of Catalytically Inactive Pt in Corrosion Studies of Pt exp + Implanted Ti.
B. R. Appleton, E. J. Kelly, C. W. White, N. G. Thompson, and B. D. Lichter. Aug 80, 25p
Contract W-7405-ENG-26
Ion beam modification of materials conference, Albany, NY, USA, 14 Jul 1980.

This investigation is part of an ongoing research project directed at applying the techniques of ion implantation doping and ion scattering analysis to identify the mechanisms associated with the anodic dissolution of Ti-Pt alloys. The Ti-Pt alloys produced by ion implantation were electrochemically examined in hydrogen saturated 1 N H sub 2 SO sub 4 by both potentiostatic polarization and open-circuit potential methods. In this study, Ti samples implanted to relatively high doses (5.4 x 10 exp 15 to 2.9 x 10 exp 16 atoms/cm exp 2) were examined by ion scattering analysis at various stages in the electrochemical measurements. Quantitative measurements showed that the majority of the implanted Pt accumulated on the surface during anodic dissolution and underwent large scale surface migration. Evidence is also presented for the transition of the Pt on the surface from a catalytically active to inactive state. Possible mechanisms for the observed catalytically inactive Pt are discussed. (ERA citation 05:035148)

CONF-800907-2 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Progress Toward Analytical Description of the Creep Strain-Time Behavior of Engineering Alloys.
M. K. Booker. 1980, 16p
Contract W-7405-ENG-26
Aspects of creep conference, Sheffield, UK, Sep 1980.

Elevated-temperature design methods in the United States often require a comprehensive description of the properties of the construction materials. These descriptions include representations for creep strain-time behavior as a function of stress, temperature, and material variability. Work conducted at this laboratory in the past five years toward the development of analytical techniques to derive such representations is summarized. Results for several common elevated-temperature structural materials are presented to illustrate the techniques. (ERA citation 05:035153)

CONF-800960-1 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Recovery of Uranium from Lignites.
F. J. Hurst. 1980, 43p
Contract W-7405-ENG-26
Western regional conference on gold, silver, uranium and coal, Rapid City, SD, USA, 18 Sep 1980.

Uranium in raw lignite is associated with the organic matter and is readily soluble in acid (and carbonate) solutions. However, beneficiation techniques were not successful for concentrating the uranium or removing part of the reagent-consuming materials. Once the lignite was heated, the uranium became much less soluble in both acid and carbonate solutions, and complete removal of carbon was required to convert it back to a soluble form. Proper burning improves acid-leaching efficiency; that is, it reduces the reagent consumption and concentrates the uranium, thereby reducing plant size for comparable uranium throughput, and it eliminates organic fouling of leach liquors. Restrictions are necessary during burning to prevent the uranium from becoming refractory. The most encouraging results were obtained by flash-burning lignite at 1200 to 1300 exp 0 C and utilizing the released SO sub 2 to supplement the acid requirement. The major acid consumers were aluminum and iron. (ERA citation 05:036047)

COO-2119-23 PC **A02**/MF **A01**
Case Western Reserve Univ., Cleveland, OH. Dept. of Metallurgy and Materials Science.
Experiments in High Voltage Electron Microscopy. Progress Report, October 31, 1979-July 1980.
T. E. Mitchell, L. W. Hobbs, T. Mukai, H. Liu, and M. Pascucci. Jul 80, 18p
Contract AS02-76ER02119

Radiation effects in alloys and ceramics are reported. There is a variety of effects of irradiation on phase stability in alloys, including radiation-induced and enhanced phase instability, disordering and secondary defect formation in various alloys. In ceramics, the response to irradiation can be even more complex due to considerations of stoichiometry and imbalance in the spectrum of primary defects (anions and cations). These responses are categorized in three ways: (a) the formation of stoichiometric defects (loops and voids), (b) decomposition or precipitation of a second phase, and (c) transition from the crystalline to the amorphous state (amorphization or metamictization). (ERA citation 05:036939)

COO-5002-10 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Dept. of Materials Science and Engineering.
Simulation of the Structure of Vacancies in High Angle Grain Boundaries.
P. D. Bristowe, A. Brokman, F. Spaepen, and R. W. Balluffi. Jun 80, 9p
Contract AS02-78ER05002

Since the modeling approach used in an earlier work is used at an atomic level, this is the most appropriate and reliable technique available. To complement this study, however, we have also employed a hard sphere dynamic model and a bubble raft model because in the past they have provided useful qualitative insight into the structure of a variety of defects in two-dimensional crystalline and amorphous systems. The computed results form part of a wider investigation of vacancies and interstitials in various grain boundaries in which the binding energies are analyzed and related to the defect structure and form of the interatomic potential. (ERA citation 05:035150)

DOE/ER/10475-T1 PC **A02**/MF **A01**
Southwest Research Inst., San Antonio, TX.
Study and Modeling of High Temperature Fatigue Crack Propagation in Austenitic Stainless Steel. Progress Report for 1980.
D. L. Davidson. 1 Sep 80, 17p
Contract AS05-79ER10475

The preparation of equipment and the refining of experimental techniques for the determination of crack tip plasticity under cyclic conditions at high temperature was emphasized. Part of the equipment is now completed and part remains to be completed. With what is now ready, the part of the experimental investigaton originally proposed for the first year should be substantially completed by the end of that contract period. (ERA citation 05:036911)

DOE/NASA/1040-15 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Creep-Rupture Behavior of Seven Iron-Base Alloys after Long Term Aging at 760 exp 0 C in Low Pressure Hydrogen.
W. R. Witzke, and J. R. Stephens. Aug 80, 38p
NASA-TM-81534
Contract AI01-77CS51040

Candidate iron-base alloys for heater tube application in the Stirling automotive engine were aged at 760 exp 0 C for 3500 h in a low pressure argon or hydrogen atmosphere to determine the effect on mechanical behavior. The seven alloys evaluated were N-155, 19-9DL, 316SS, Nitronic 40, A286, Incoloy 800H, and RA330. Aging produced no appreciable changes in alloy grain size but did promote increased density and growth of precipitate particles in the grains and grain boundaries. Tensile properties were generally degraded by aging, with ductility and strength changes being influenced by grain structure. Aging also decreased creep-rupture strength, with coarse grain materials being more susceptible to strength loss. The presence of hydrogen during aging did not contribute significantly to creep strength degradation in the coarse grain alloys but did result in extensive strength losses in fine grain alloys. Based on current criteria for the Mod I Stirling engine, the N-155 and 19-9DL alloys were the only alloys in this study with strengths adequate for heater tube service at 760 exp 0 C. (ERA citation 05:036874)

GKSS-79/E/28 PC **A06**/MF **A01**
Gesellschaft fuer Kernenergieverwertung in Schiffbau und Schiffahrt m.b.H., Geesthacht-Tesperhude (Germany, F.R.).
Investigation of the Kinetics of Internal Oxidation of Cu-Fe Alloys with the Help of Moessbauer Spectroscopy.
S. D. Mirtorabi. 1979, 119p
In German.
U.S. Sales Only.

Homogeneous and supersaturated Cu Fe mixed crystals are oxidated at an oxygen partial pressure which lies below the decomposition pressure of the copper oxides. With the help of Moessbauer spectroscopy, it is possible to track the kinetics of each iron state during internal oxidation. Corrosion products are magnetite, wuestite, and delafossite. The appearance of these compounds depends on the composition of the mixed crystal, the oxidation temperature and the oxidation time. (Atomindex citation 11:515215)

INIS-mf-5604 PC **A05**/MF **A01**
Vienna Univ. (Austria).
Investigation of the Structure of Molten Nickel by Means of Neutron Scattering.
Theses Dr. phil,
E. M. Erdpresser. 1979, 93p
In German.
U.S. Sales Only.

The main objective of the work reported was to examine the structure of molten nickel at 1873 exp 0 K under conditions in which errors due to the crucible would be minimised. The crucible used consisted of a single crystal of sapphire (Al sub 2 O sub 3) with a ground-in stopper of the same material. Coherent peaks were obviated by appropriate orientation of the crucible. A vanadium rod was used for calibration, the effective spin-quantum number lying between zero and 0.3. The structure data were compared with PY-hardcore model calculations and good agreement obtained by an extension of the hardcore model corresponding to an attraction factor in the pair-potential. The pair distribution function g(r) was determined by Fourier transformation and from that the pair-potential calculated by five different currently used methods. Results are given in tables and graphically. (Atomindex citation 11:515180)

INIS-mf-5605 PC **A06**/MF **A01**
Vienna Univ. (Austria).
Investigation of the Structure of Molten Copper by Means of Neutron Scattering.
Theses Dr. phil,
H. F. Stiller. 1979, 104p
In German.
U.S. Sales Only.

The work reported covers an investigation of the structure of molten copper by means of neutron scattering (approximately 1A) at 1120 exp 0 and 1560 exp 0 C, in single-crystal sapphire crucibles with different diameters. One measurement was made at 1120 exp 0 C using a tantalum crucible. The reproducibility of the measurements and the applicability of the applied corrections were studied under various conditions. Multiple scattering was given special attention and calculations according to Blech and Averbach and Copley's Monte-Carlo programme were compared with experimental results. The calculation of the structure factor is described in detail and the results are compared with those of earlier researches. Calcu-

lations of the pair-correlation factors and of the pair-potential by five different methods are given, and the effect of smoothing and that of the characteristic of the structure in the range of small Q on the pair-potential are examined. (Atomindex citation 11:515232)

IPNO-PhN-79-19 PC **A02**/MF **A01**
Paris-11 Univ., Orsay (France). Inst. de Physique Nucleaire.
Influence of Yttrium Implantation on the Oxidation Behavior of Ni sub 67 Cr sub 33 , FeNi sub 43 Cr sub 27 , FeNi sub 41 Cr sub 25 Al sub 10 Refractory Alloys.
J. C. Pivin, C. Roques-Carmes, J. Chaumont, and H. Bernas. 1979, 24p
U.S. Sales Only.

The properties of yttrium- and argon- implanted Ni Cr, Fe Ni Cr and Fe Ni Cr Al refractory alloys were studied by thermogravimetry, secondary ion mass spectrometry and scanning electron microscopy. Yttrium dissolves in the oxide layer of Ni Cr and Fe Ni Cr, changing its growth rate, composition and adherence. For Fe Ni Cr Al, which develops an Al sub 2 O sub 3 layer, only the adherence is improved. Radiation damage has no significant effect on the oxidation properties. (Atomindex citation 11:511806)

IS-4722 PC **A03**/MF **A01**
Ames Lab., IA.
Electrotransport of Solutes in Refractory Metals. Final Report, October 1, 1978-December 14, 1979.
F. A. Schmidt, O. N. Carlson, M. S. Beck, D. K. Rehbein, and D. E. Williams. 1979, 31p
Contract W-7405-ENG-82

The electric mobilities, diffusivities and effective valences were determined for molybdenum, rhenium, tungsten and zirconium in beta -thorium. All four solutes migrated in the same direction as the electron flow. Rhenium and molybdenum were found to be very mobile with tungsten somewhat slower. Zirconium was found to move at a rate near that of the self-diffusion of beta -thorium, viz., approximately two orders of magnitude slower than rhenium and tungsten. The electromigration velocities showed a similar trend. Comparison was made between experimental data obtained by laser ion mass spectrometry and theoretical transport equations for two purification experiments. Good agreement was obtained with both the concentration profile predicted by DeGroot and the purification ratio predicted by Verhoeven. (ERA citation 05:035158)

N81-10155/2 PC **A06**/MF**A01**E
Oxford Univ. (England). Dept. of Engineering Science.
The Effect of Strain Rate on the Flow and Fracture of alpha-Uranium.
J. Huddart, and J. Harding. Dec 79, 112p OUEL-1304/79
Sponsored by UK Min. Of Defence (Procurement Executive).

Tensile test at strain rates from 0.0001 to 1000 1/sec were performed on specimens with different fabrication histories and impurity contents ranging from 240 to 650 ppm. At the highest strain rates a marked increase of the rate-sensitivity of the flow stress was observed. Metallographic examination carried out using optical and electron microscopy show a clearly marked ductility transition in the vacuum annealed specimens. The different fracture behavior shown by the various materials in the various heat treatment conditions are explained assuming three fracture mechanisms.

N81-10156/0 PC **A03**/MF **A01**
Centre Technique des Industries Mecaniques, St. Etienne (France).
Forging Applications of Dispersoid Alloys (Exploratory Study) Application des Aciers a Dispersoides a l'Estampage (Etude Exploratoire).
Final Report.
A. Durand. Jan 80, 31p CETIM-1-3K-30-0
Text in French.

The theoretical aspects of dispersoid alloys are discussed together with the following characteristics: hardening by slow cooling and effects of different microalloying elements notably vanadium and niobium. The results of tests carried out on rough rolled 40 mm diameter rods of 48 MV4 alloy are presented. Emphasis is given to chemical composition and metallurgical characteristics before and after forging. It is concluded that a significant gain in strength can be achieved by alloying in this way. Homogeneity characteristics are good.

N81-10157/8 PC **A03**/MF **A01**
Centre Technique des Industries Mecaniques, St. Etienne (France).
Study of Growth Conditions and Electronic Properties of Double Heterojunctions Prepared in the Vapor Phase for Optoelectronic Applications le Fibrage et les Caracteristiques Mecaniques des Pieces Forgees.
J. L. Montagut. 18 Jan 80, 49p CETIM-1-3X-00-0
Text in French.

The process taking place is defined and examples of typical manifestations are given. Better behavior and longer lifetimes can be obtained by optimizing grain or fiber structure characteristics. It is particularly important to ensure that the fins of joints are positioned outside stress zones. The skin of the part in question must not be decarbonized if a good fiberization is to be retained nor must fibers be allowed to run into the surface at critical zones. These problems can be overcome by appropriate surface treatment; shot peening, nitrogen case-hardening, etc. Practical examples are given.

N81-10158/6 PC **A03**/MF **A01**
Centre Technique des Industries Mecaniques, Senlis (France).
Study of the Corrosion of Metallic Materials Protected by Organic Coatings: Development of an Electrochemical Test Etude de la Corrosion des Materiaux Metalliques Proteges Par Revetements Organiques: Mise au Point d'UN Test Electrochimique.
Final Report.
Sep 79, 33p CETIM-12-C-10-0
Text in French.

A rapid testing method was developed to determine the porosity of organic coatings. A given coating must resist the aggresssivity of the medium to which it is exposed while totally isolating the metallic substrate from this medium. Polarization resistances are measured in this method. The equipment used is described and the results obtained for the behavior of various coatings (glycerophtalic, polyester, etc.) and of coating thicknesses with time are presented. The method is accurate and produces reproducible results.

N81-10159/4 PC **A02**/MF **A01**
Centre Technique des Industries Mecaniques, Senlis (France).
Bibliographic Study on the Suitability of Cast Iron for Surface Treatments Recherche Bibliographique sur l'Aptitude des Fontes a Recevoir UN Traitement de Surface.
F. Mortier, and J. J. Sabatier. Jan 80, 11p
CETIM-12-X-30-0
Text in French.

Emphasis is given to electrolytically deposited surface finishes. The conclusions are drawn that high quality casts free from sand occlusions, surface porosity, carbon module segregation and silicate type inclusions are required. Mechanical precleaning is necessary (vapor blasting, sanding). Predeposit descaling operations must be adapted to the particular type of cast iron employed and its heat treatment. The specific problems and techniques associated with the different deposits envisaged are presented.

ORNL/TM-7470 PC **A04**/MF **A01**
Oak Ridge National Lab., TN.
ORNL Irradiation Creep Facility.
T. C. Reiley, R. L. Auble, R. M. Beckers, E. E. Bloom, and M. G. Duncan. Sep 80, 54p
Contract W-7405-ENG-26

A machine was developed at ORNL to measure the rates of elongation observed under irradiation in stressed materials. The source of radiation is a beam of 60 MeV alpha particles from the Oak Ridge Isochronous Cyclotron (ORIC). This choice allows experiments to be performed which simulate the effects of fast neutrons. A brief review of irradiation creep and experimental constraints associated with each measurement technique is given. Factors are presented which lead to the experimental choices made for the Irradiation Creep Facility (ICF). The ICF consists of a helium-filled chamber which houses a high-precision mechanical testing device. The specimen to be tested must be thermally stabilized with respect to the temperature fluctuations imposed by the particle beam which passes through the specimen. Electrical resistance of the specimen is the temperature control parameter chosen. Very high precision in length measurement and temperature control are required to detect the small elongation rates relevant to irradiation creep in the test periods available (approx. 1 day). The apparatus components and features required for the above are presented in some detail, along with the experimental procedures. The damage processes associated with light ions are discussed and displacement rates are calculated. Recent irradiation creep results are given, demonstrating the suitability of the apparatus for high resolution experiments. Also discussed is the suitability of the ICF for making high precision thermal creep measurements. (ERA citation 05:035172)

PB81-115032 PC **A03**/MF **A01**
Krupp (Fried.) G.m.b.H., Wilhelmshaven (Germany, F.R.). Kranbau.
Entwicklung eines Geraetes zur gefahrlosen Messung von Temperatur, Sauerstoff- und Kohlenstoffgehalt und zur Probenentnahme der Stahlschmelze aus LD-Konvertern (Automatic Measuring- and Sampling-Cartridge Handler for Converters),
Wilhelm Schwarz. Jun 80, 39p BMFT-FB-HA-80-007
Also pub. as ISSN-0171-7618. Text in German, abstract in English.

An automatic handler will be applied for measuring the temperature and taking samples in converters, both required to ensure proper process control in steelmaking shops. The handler advances vertically down towards and into the converter. Industrial-type sacrificial cartridges with cardboard casing are being used. The cartridge magazine will take 28 each of the 3 various cartridge types. The handler couples the cartridges, cuts the sampling heads off and drops the burned cardboard casings into the converter.

PB81-118283 PC **A10**/MF **A01**
Department of Energy, Washington, DC.
Structure and Properties of Light Alloys,
A. M. Korol'kov. c1980, 222p TT-76-52003
Trans. of mono. Struktura i Svoistva Legkikh Splavov, Moscow, 1971, by R. Thyagarayan. Sponsored in part by National Science Foundation, Washington, DC. Special Foreign Currency Science Information Program.

In the collection, articles are presented in which the results of physico-chemical investigations on noble and light alloys, carried out in recent times and connected with the development and adoption of the most promising alloys and their processing methods have been expounded. These investigations include, construction of binary and ternary phase diagrams, study of the effect of doping content of elements on the structure and properties of noble and light alloys, study of the process of crystallization, decay of supersaturated solid solution, recovery and recrystallization. In these articles, great attention has been paid to the relation between various properties of alloys, e.g. mechanical, physical and others, and their structure as well as the conditions of producing one or other of these structures.

PB81-118507 Not available NTIS
National Bureau of Standards, Washington, DC.
Room-Temperature Elastic Constants and Low-Temperature Sound Velocities for Six Nitrogen-Alloyed Austenitic Stainless Steels.
Final rept.,
H. M. Ledbetter. Jun 80, 3p
Pub. in Metallurgical Transactions A 11A, p1067-1069 Jun 80.

Despite large composition differences, ultrasonic-velocity measurements in six nitrogen-strengthened stainless steels show that their elastic con-

stants differ only slightly except as affected by low-temperature magnetic transitions.

PB81-118549 Not available NTIS
National Bureau of Standards, Washington, DC.
Low-Temperature Magnetic and Elastic-Constant Anomalies in Three Manganese Stainless Steels.
Final rept.,
H. M. Ledbetter, and E. W. Collings. 1978, 19p
Sponsored in part by Advanced Research Projects Agency, Arlington, VA.
Pub. in Proc. Symp. AIME Annual Meeting (107th) held at Denver, CO, Mar 2, 1978). Paper in The Metal Science of Stainless Steels, p22-40 (The Metallurgical Soc. of AIME, Warrendale, PA, 1978).

Elastic properties of three austenitic stainless steels -- Fe-22Cr-13Ni-5Mn, Fe-21Cr-6Ni-9Mn, and Fe-18Cr-3Ni-13Mn -- were studied between room temperature and either liquid-nitrogen or liquid-halium temperature. A dynamic (pulse-echo, 10 MHz) method was used to determine longitudinal and transverse sound-wave velocities, which were converted to elastic constants -- Young's modulus, shear modulus, bulk modulus, and Poisson's ratio. At low temperatures all the elastic contents are anomalous, correlating with what appear to be spin-glass-type magnetic transitions detected by magnetic susceptibility measurements. The transition temperatures depend strongly on Mn content. Higher Mn content results in a higher transition temperature and a larger elastic-content anomaly.

PB81-120289 PC **A11**/MF **A01**
Indian Lead Zinc Information Centre, New Delhi.
Seminar on Zinc Wastes and Their Utilization Technical Papers Held at New Delhi, India on October 15 and 16, 1980.
Nov 80, 227p

Topics covered are zinc sulfate and zinc recovery.

PB81-123267 PC **A06**/MF **A01**
Moleculon Research Corp., Cambridge, MA.
Poroplastic Bound Liquid Membranes for Hydrometallurgical Processing.
Final rept.,
Arthur S. Obermayer, Larry D. Nichols, Marie Baroni Allen, Gerard Nahum, and Robert P. Caron. 30 Sep 80, 125p NSF/RA-800230
Grant NSF-DAR78-19226
Color illustrations reproduced in black and white.

Application of liquid ion-exchange membrane technology in hydrometallurgical systems to extract metals from ores and to remove harmful metallic species from industrial effluents is reported. Specific areas investigated were load and strip rates, metal selectivity, long-term membrane stability, membrane fabrication, and operational economics. Studies were conducted on tungsten extraction from Searles Lake brine, chromate removal and recovery from industrial plating rinse waters, and separation of nickel and cobalt ions from simulated lateritic leach solutions. Results demonstrate that isolation of tungsten requires a new ion exchange reagent ultrasensitive for this metal; extraction of chromate wastes requires effective, phase-stable solvents for quaternary ammonium salts exchangers; and commercial separation of cobalt from nickel may depend on improved poisoning-resistant and ammonia-impermeable reagents. The critical factor in all three cases only incidentally involves intrinsic capabilities of Poroplastic membranes. The study emphasizes the preemptive importance of highly specific chemical engineering factors over general considerations of materials and operating principles.

PNL-3385 PC **A03**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Monitoring Instrument Field Experiments at Oregon Institute of Technology.
M. J. Danielson, and R. P. Smith. Sep 80, 33p
Contract AC06-76RL01830

The field tests were conducted under reducing and oxidizing conditions. Corrosion rates with zero oxygen were about 1.1 mils per year (mpy) for both copper and steel coupons, which is quite low for carbon steel. There was a problem controlling the oxygen level in the oxygenated experiments; however, it was found that corrosion rates increased with the presence of oxygen. Corrosion rates for the steel and copper coupons were 4 and 2 mpy, respectively; copper coupled to cast iron corroded at 8 mpy. Commercial corrosion rate measuring equipment determined the general corrosion rate of carbon steel farily well but overestimated copper corrosion rates. The redox electrode was a very sensitive indicator of the entry of oxygen. (ERA citation 05:036554)

SAND-80-0964C PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Corrosion Problems in Ti/KC1O sub 4 Loaded Devices when Subjected to Humid Environments.
T. M. Massis, J. T. Healey, D. H. Huskisson, and W. G. Perkins. 1980, 17p CONF-801048-6
Contract AC04-76DP00789
ADPA compatibility meeting, Blacksburg, VA, USA, 13 Oct 1980.

A piston motor/igniter loaded with a Ti/KClO sub 4 pyrotechnic and sealed with a silicone adhesive exhibited serious corrosion problems during aging. Five 24-hour thermal cycles between room temperature and 71 exp 0 C at 90% relative humidity resulted in extensive surface corrosion of the Kovar pins and severe stress corrosion cracking of the Kovar pins in the vicinity of the bridgewire weld. No corrosion or cracking of the Nichrome bridgewire was observed. Similar results were observed after 60 days at 50% and 90% relative humidity at room temperature. Tests at ambient relative humidity and room temperature caused limited surface corrosion and no observable cracking. It was determined that these problems resulted from the combined presence of chlorine containing contaminants and atmospheric moisture. Chlorine was detected in both the surface corrosion product and the corrosion product in the subsurface cracks. The absence of reaction and/or morphological alteration of the Ti/KClO sub 4 at the pyrotechnic interface with the Kovar indicated the pyrotechnic was not involved in the corrosion reaction, and, hence, the chlorine was present in the surface contamination on the Kovar pins. The aging tests indicate that external moisture was involved in the corrosion reaction. Calculation and experimentation have shown the silicone adhesive used to seal these devices to be permeable to water vapor, and the moisture conditions inside the devices equilibrated with external conditions within a few hours. Corrosion and cracking could be solved by eliminating the source of moisture by hermetically sealing the devices. Tests of hermetically sealed units have confirmed this conclusion. (ERA citation 05:036965)

SAND-80-6018 PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Method and Vessel for Carrying out Metallothermic Reactions, in Particular Aluminothermic Reductions.
B. Teague. 22 Jul 80, 13p
Contract AC04-76DP00789
C German Patent 1,032,936.

A method for carrying out metallothermic (aluminothermic) reactions in a refractory-lined, crucible-shaped reduction vessel is described. At the conclusion of the reduction reaction, the liquid slag is withdrawn by a lip in a horizontally divided vessel. (ERA citation 05:037118)

SAND-80-8033 PC **A03**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Etching and Plating of Nominal U-6 Wt % Nb Alloys.
H. R. Johnson, J. W. Dini, and D. H. Wood. Aug 80, 26p CONF-801061-1
Contract AC04-76DP00789
Conference on high density penetration materials, Charlottesville, VA, USA, 28 Oct 1980.

The adhesion of electrodeposited nickel to U-Nb alloys is of interest for joining materials by plating and for protection from corrosive environments. Because uranium alloys are passive, a surface preparation procedure such as etching in acid is necessary before plating to provide mechanical keying of the electrodeposit. When nitric acid has served as the etchant, there have been occasional violent reactions between the oxidizing acid and the alloy. We have observed that a sulfuric acid/hydrochloric acid etchant eliminates this problem. Furthermore, quantitative test data for nominal U-6 wt % Nb alloys plated with nickel demonstrated that with parts etched anodically in a solution of sulfuric and hydrochloric acids, high-strength bonds can be obtained; nominal shear and tensile bond strengths were 250 and 115 MN/m exp 2 respectively. Electrochemically etched U-Nb rods joined to 7075-T6 Al rods with thick nickel plating showed a nominal fracture stress in excess of 470 MN/m exp 2 . Bare and Ni-plated tensile bars showed no significant changes in mechanical properties due to electrochemical etching and plating, but did exhibit changes due to Nb content and heat treatment. (ERA citation 05:036937)

UCID-18593 PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Laboratory Procedures Used in the Hot Corrosion Project.
T. R. Jeys. 8 Apr 80, 32p
Contract W-7405-ENG-48

The objective of the Hot Corrosion Project in the LLNL Metals and Ceramics Division is to study the physical and chemical mechanisms of corrosion of nickel, iron, and some of their alloys when these metals are subjected to oxidizing or sulfidizing environments at temperatures between 850 and 950 exp 0 C. To obtain meaningful data in this study, we must rigidly control many parameters. Parameters are discussed and the methods chosen to control them in this laboratory. Some of the mechanics and manipulative procedures that are specifically related to data access and repeatability are covered. The method of recording and processing the data from each experiment using an LS-11 minicomputer are described. The analytical procedures used to evaluate the specimens after the corrosion tests are enumerated and discussed. (ERA citation 05:035170)

11H. Oils, Lubricants, and Hydraulic Fluids

N81-10170/1 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Effect of Substrate Surface Finish on the Lubrication and Failure Mechanisms of Molybdenum Disulfide Films.
R. L. Fusaro. 1980, 40p NASA-TM-81595, E-9715
Proposed for Presentation at Annual Meeting of the AM. Soc. Of Lubrication Engr., Pittsburg, 11-14 May 1981.

An optical microscope was used to study the lubrication and failure mechanisms of rubbed (burnished) MoS2 films applied to three substrate surface finishes - polished, sanded, and sandblasted - as a function of sliding distance. The lubrication mechanism was the plastic flow of thin films of MoS2 between flat plateaus on the rider and on the metallic substrate. If the substrates were rough, flat plateaus were created during 'run in' and the MoS2 flowed across them. Wear life was extended by increasing surface roughness since valleys in the roughened substrate served as reservoirs for MoS2 and a deposit site for wear debris. In moist air, the failure mechanism was the transformation of metallic colored MoS2 films to a black, powdery material that was found by X ray diffraction to consist primarily of alpha iron and MoO3 powders. In dry argon, the failure mechanism was the gradual depletion of the MoS2 film from the contact region by transverse flow. Analysis of the wear debris on the wear track at failure showed it consisted mainly of alpha iron and some residual MoS2. No molybdenum oxides were found.

11I. Plastics

AD-A091 170/1 PC **A02**/MF **A01**
Naval Air Development Center, Warminster, PA. Aircraft and Crew Systems Technology Directorate.
Repetitive Molecular Exclusion Chromatography of PGBx on Sephadex LH-20.
Phase rept.,
H. W. Shmukler, S. F. Kwong, W. Feely, M. G. Zawryt, and E. Polis. 2 Oct 80, 15p Rept no. NADC-80183-60

PGBx, a mixture of oligomers of 15-keto PGB1, was subjected to repetitive MEC on Sephadex LH-20 in an attempt to separate and purify the active principle. The resulting fractions were analyzed and found still to be heterogeneous. Although the MEC technique did not resolve the PGBX complex, low molecular weight fractions were obtained that may be amenable to mass spectral analysis. (Author)

BNL-51155 PC **A03**/MF **A01**
Brookhaven National Lab., Upton, NY.
Polyketones and Polysulfones for Conservation in the Ethylene Polymer Industry. Progress Report No. 6, July-September 1979.
M. Steinberg, R. Johnson, D. Elling, W. Cordes, and D. Goodman. Jan 80, 34p
Contract AC02-76CH00016

The characterization study on ethylene-CO (Et-CO) copolymers was concluded. The copolymers were prepared at various levels of CO composition, and with several methods loss of catalysis, including free-radical, metallic, and exp 60 Co irradiation. Et-CO copolymers exhibit crystallinity related to the alternating polyketone structure which increasees logarithmically with CO content over the range 28% to 49% CO. The melting point increases in essentially the same manner as crystallinity. The structure of the copolymers is independent of the type of catalysis used. Highly crystalline copolymers showed discoloration and loss of crystallinity at 140 exp 0 C, whether in air or N sub 2 . Discoloration is severe at 210 exp 0 C, and after heating at 280 exp 0 C for 1 h, essentially all crystallinity was lost. Press molding of highly crystalline copolymer at 260 exp 0 C for 5 minutes showed 38.8% loss of crystallinity and appearance of H sub 2 O and olefinic unsaturation. Reaction kinetic studies on the low-pressure (< 5 atm) gas-phase copolymerization of ethylene - SO sub 2 (Et-SO sub 2) mixtures at a dose rate of 0.54 Mrad/h and at 10 to 13 exp 0 C were continued. Recharging a reaction system repeatedly with a mixture containing 19.2 mole % S sub 2 initially resulted in a general increase in G-value from 4.60 x 10 exp 4 to 7.10 x 10 exp 4 molecules/100eV and a factor of 4.6 decrease in reaction time for the attainment of peak rate and G-value. Low-pressure (< 5 atm) gas-phase exp 60 Co gamma copolymerization at a dose rate of 0.56 Mrad/h and at 10 to 13 exp 0 C of a 1-butene-SO sub 2 mixture of approximately equimolar composition resulted in peak and overall G-values of 340 and 156, respectively, and product of nearly equimolar composition. For safety reasons the experimental radiation facility for conducting the copolymer studies was relocated to another building and a 5300 Ci exp 60 Co gamma radiation source was transferred to the new facility. (ERA citation 05:036842)

BNL-51234 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Polysulfones for Conservation in the Ethylene Polymer Industry. Progress Report No. 7, October 1979-March 1980.
M. Steinberg, R. Johnson, D. Elling, P. Bernstein, and A. E. Varker. Jun 80, 21p
Contract AC02-76CH00016

Ethylene-SO sub 2 polysulfone copolymers were prepared by exp 60 Co gamma radiation, as well as by electron-beam radiation and by thermocatalysis, as a means of incorporating a polluting waste product material such as SO sub 2 into ethylene polymers for the purpose of conserving ethylene feedstock. Ethylene-SO sub 2 copolymer was pressure molded into discs which had a high degree of hardness as well as partial transparency, but were also very brittle. Differential Scanning Calorimetry (DSC) and Thermal Gravimetric Analysis (TGA) indicated peak decomposition at 350 exp 0 C. Long term heat aging tests showed stability to 175 exp 0 C and initiation of decomposition at 200 exp 0 C in air after 900 h. Decomposition became severe as the temperature was increased to 300 exp 0 C. The activation energies for decomposition were 57.3 and 56.8 kcal/mole for liquid-phase and gas-phase formed copolymers, respectively. The ethylene-SO sub 2 copolymer was modified by the incorporation of monomeric styrene, 2-vinyl pyridine, 4-vinyl pyridine, and N-vinyl pyrrolidine. A summary of characterization studies by INCO which includes solubility, infra-red and x-ray analysis of the ethylene-SO sub 2 copolymer and with additives are presented. (ERA citation 05:036843)

11J. Rubbers

N81-10168/5 PC **A02**
Societe Nationale Industrielle Aerospatiale, Suresnes (France). Lab. Central.
Elastomers Used in Aeronautics Industry les Elastomeres Utilises dans l'Industrie Aeronautique.
G. Dallemagne. 11 Jun 80, 25p SNIAS-801-551-105
Text in French. Presented at Stage Mater. Nonmetal., Jun. 1980.

The physicochemical structure of elastomers is briefly examined. The performance of various elastomers under specific conditions is given. Their uses in various aircraft components and systems are discussed. Classification and standardization procedures are exposed together with the testing equipment employed and the results obtained.

12. MATHEMATICAL SCIENCES

12A. Mathematics and Statistics

AD-A090 825/1 MF **A01**
Wisconsin Univ.-Madison. Mathematics Research Center.
A Population of Linear, Second Order Elliptic Partial Differential Equations on Rectangular Domains. Part 2.
Technical summary rept.,
John R. Rice, Elias N. Houstis, and Wayne R. Dyksen. May 80, 157p Rept no. MRC-TSR-2079
Contracts DAAG29-80-C-0041, DAAG29-75-C-0024
Sponsored in part by Grants NSF-MCS77-01408 and NSF-MCS79-01437.
Availability: Microfiche copies only.

This report contains the machine readable form of the 189 partial differential equations presented in MRC Technical Summary Report No. 2078 'A POPULATION OF LINEAR, SECOND ORDER, ELLIPTIC PARTIAL DIFFERENTIAL EQUATIONS ON RECTANGLES - PART 1.' These are two large files: EQNFIL contains 189 entries which are either complete statements of a PDE in the ELLPACK language or a reference to an entry in MACFIL with parameter values given. MACFIL contains the 42 parameterized PDE's in a form suitable for automatically substituting in parameter values. A few other small files are given to facilitate using this problem population within the ELLPACK system. (Author)

AD-A090 866/5 Not available NTIS
Texas Inst. for Computational Mechanics, Austin.
Finite Element Patch Approximations and Alternating-Direction Methods,
Linda J. Hayes. 1980, 6p ARO-16207.5-GS
Contract DAAG29-79-C-0081
Presented at the IMACS International Symposium on Computer Methods for Partial Differential Equations (3rd), Bethlehem, PA. 20-22 Jun 79.
Availability: Pub. in Mathematics and Computers in Simulation, v22 p25-29 1980 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A090 867/3 Not available NTIS
Texas Inst. for Computational Mechanics, Austin.
Gershgorin Theory for Stiffness and Stability of Evolution Systems and Convection-Diffusion,
G. F. Carey, and K. Sepehrnoori. 14 Mar 79, 27p ARO-16207.1-GS
Contract DAAG29-79-C-0081
Availability: Pub. in Computer Methods in Applied Mechanics and Engineering, v22 p23-48 1980 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A090 876/4 Not available NTIS
Iowa State Univ., Ames.
On Bahadur's Representation of Sample Quantiles for Nonstationary Mixing Processes,
David A. Sotres, and Malay Ghosh. 1978, 16p ARO-13198.6-M
Grant DAAG29-76-G-0057
Availability: Pub. in Calcutta Statistical Association Bulletin, v27 nos105-108 Mar-Jun-Sep-Dec 78 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A090 885/5 PC **A02**/MF **A01**
Texas Univ. at Austin. Electronics Research Center.
The Strong Uniform Consistency of Kernel Density Estimates,
Luc P. Devroye, and T. J. Wagner. 1980, 21p AFOSR-TR-80-0797
Contract F49620-77-C-0101, Grant AFOSR-77-3385
Pub. in Proceedings of the International Symposium on Multivariate Analysis (5th), p59-77 1980.

No abstract available.

AD-A090 967/1 PC **A02**/MF **A01**
North Carolina Univ At Chapel Hill Dept of Statistics
On the Rate Distortion Functions of Memoryless Sources under a Magnitude-Error Criterion,
Hoi M. Leung, and Stamatis Cambanis. 26 Aug 77, 19p AFOSR-TR-80-0803
Grant AFOSR-75-2796
Pub. in Information and Control, v44 n2 p116-133 Feb 80.

No abstract available.

AD-A090 971/3 PC **A02**/MF **A01**
California Univ., Santa Barbara. Inst. for Algebra and Combinatorics.
A Subdeterminant Inequality for Normal Matrices,
Marvin Marcus, and Kenneth Moore. 3 Sep 79, 17p AFOSR-TR-80-0971
Contract F49620-78-C-0030
Pub. in Linear Algebra and Its Applications, v31 p129-143 1980.

No abstract available.

AD-A090 972/1 PC **A02**/MF **A01**
South Carolina Univ., Columbia. Dept. of Mathematics and Computer Science.
Maximum Likelihood Estimation of a Distribution Function with Increasing Failure Rate Based on Censored Observations,
W. J. Padget, and L. J. Wei. Jun 79, 7p AFOSR-TR-80-0970
Contract F49620-79-C-0140
Pub. in Biometrika, v67 n2 p470-474 1980.

No abstract available.

AD-A091 001/8 Not available NTIS
California Inst of Tech., Pasadena.

Periodically Perturbed Bifurcation. 1. Simple Bifurcation,
S. Rosenblat, and Donald S. Cohen. 2 Mar 79, 24p ARO-15622.12-M
Contract DAAG29-78-C-0011, Grant NSF-MCS78-03036
Availability: Pub. in Studies in Applied Mathematics, v63 p1-23 1980 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A091 008/3 PC **A06**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH.
Linear Multistep Methods with Near-Optimal Stability.
Doctoral thesis,
David Jerome Nolting. Dec 79, 108p Rept no. AFIT-CI-79-244D

Desirable properties of linear multistep methods (LMM) can be optimized by viewing those properties as functional values and the LMM possessing those properties as points in a domain space. This study conducts two such optimizations numerically. The first is a search for relatively stable explicit LMM and the second is a search for stiffly stable implicit LMM. Near-optimally relatively stable explicit LMM are found for orders four through nine. In the second study, the concept of A(alpha, r)-stability is introduced for stiffly stable LMM. It recognizes the need for large regions of absolute stability in the left half plane and the need for a region of accuracy about the origin defined by the region of relative stability. An economical means of determining the region of relative stability is developed and used.

AD-A091 023/2 PC **A02**/MF **A01**
Rochester Univ., NY. Dept. of Statistics.
Testing Significance of a Mean Vector- A Possible Alternative to Hotelling's T2,
Govind S. Mudholkar, and Perla Subbaiah. 27 Mar 79, 13p AFOSR-TR-80-0804
Grant AFOSR-77-3360
Pub. in Annals of the Institute of Statistical Mathematics, v32 n1A p43-52 1980.

No abstract available.

AD-A091 026/5 PC **A02**/MF **A01**
Florida State Univ., Tallahassee. Dept. of Statistics.
The Influence of the Sample on the Posterior Distribution.
Interim rept.,
Salwa Fahmy, Carlos A. B. Pereira, and Frank Proschan. Apr 80, 14p FSU-STATISTICS-M545, TR-78-107-AFOSR, AFOSR-TR-80-0995
Grant AFOSR-78-3678

In this paper, we present conditions on the likelihood function and on the prior distribution which permit us to assess the effect of the sample on the posterior distribution. Our work is inspired by Whitt (1979) J. Amer. Statist. Assoc. 74, and is based on the notion of multivariate totally positive functions introduced by Karlin and Rinott (1980), unpublished report. (Author)

AD-A091 032/3 PC **A02**/MF **A01**
Texas Univ. at Austin. Dept. of Electrical Engineering.
The Lie Algebraic Structure of a Class of Finite Dimensional Nonlinear Filters.
Interim rept.,
Chang-Huan Liu, and Steven I. Marcus. 23 Jul 80, 23p AFOSR-TR-80-0879
Contract F49620-77-C-0101, Grant AFOSR-79-0025

We present an example of the application of Lie algebraic techniques to nonlinear estimation problems. The method relates the computation of the (unnormalized) conditional density and the computation of statistics with finite dimensional estimators. The general method is explained; for a particular example, the structures of the Lie algebras associated with the unnormalized conditional density equation and the finite dimensionally computable conditional moment equations are analyzed in detail. The relationship between these Lie algebras is studied, and the implications of these results are discussed. (Author)

AD-A091 035/6 PC **A02**/MF **A01**
Delaware Univ., Newark. Applied Mathematics Inst.
An Illustrative Problem in Computational Probability.
Interim rept.,
Marcel F. Neuts. Jun 80, 11p TR-60B, AFOSR-TR-80-0987
Grants AFOSR-77-3236, NSF-ENG79-08351

An elementary, but useful problem is reliability design is used to illustrate some of the principles and concerns of computational probability. A number n of items with exponential life time are placed in parallel. The time until all items have failed is denoted by U sub n. It is desirable that U sub n exceed the duraction T, where T is a random variable, independent of the n life times. We wish to determine the smallest value of n for which P(U sub n > T) exceeds 1 - epsilon. It is shown that if T has a delayed distribution of phase type, this may be done by a recursive algorithm, which avoids numerical integrations. (Author)

AD-A091 037/2 PC **A03**/MF **A01**
Delaware Univ., Newark. Applied Mathematics Inst.
A Phase Type, Semi-Markovian Point Process.
Interim rept.,
Guy Latouche. Apr 80, 27p TR-56B, AFOSR-TR-80-0989
Grants AFOSR-77-3236, NSF-ENG79-08351

A semi-Markovian point process is defined, for which the intervals of time between successive events have phase type distribution. The distribution of the number of events in an interval is examined, and it is shown how the expected number of events in an interval may be efficiently computed. A stationary version of the process is analysed. In particular, the necessary and sufficient condition under which the new process is a renewal process is determined. Simple sufficient conditions are presented. (Author)

AD-A091 039/8 PC **A03**/MF **A01**
California Univ., San Diego, La Jolla. Dept. of Applied Mechanics and Engineering Sciences.
Input Signal Synthesis for Linear and Nonlinear System Identification.
Final scientific rept. 1 Jun 75-31 May 80,
H. W. Sorenson. 1980, 36p AFOSR-TR-80-0991
Grant AFOSR-75-2839

This study will consider the general problem of optimal input signal synthesis for dynamic systems. Diffefent optimality criteria are to be investigated and compared. The primary emphasis in the study shall be on the development of feedback control policies for specific criteria. The improvements possible through the use of suitably chosen input signals will be investigated.

AD-A091 069/5 PC **A04**/MF **A01**
Foreign Technology Div., Wright-Patterson AFB, OH.
Corrective Arithmetic Codes in the Residual Class System,
S. B. Fayn. 30 Jul 80, 60p Rept no. FTD-ID(RS)T-1000-80
Edited trans. of Voprosy Vychislitel'noi Tekhniki (USSR) v7 Issue 2 p60-91, 1966, by Carol S. Nack.

No abstract available.

AD-A091 086/9 PC **A03**/MF **A01**
South Carolina Univ., Columbia. Dept. of Mathematics and Computer Science.
Some Strong and Weak Laws of Large Numbers in D(0,1).
Interim rept.,
Peter Zito Daffer, and Robert Lee Taylor. Jul 80, 43p TR-57, AFOSR-TR-80-1004
Contract F49620-79-C-0140
Prepared in cooperation with Louisiana Tech. Univ., Ruston., Dept. of Mathematics and Statistics.

Strong laws of large numbers for a sequence x sub n of random functions in D(0,1) are derived using new pointwise conditions on the first absolute moments, which improve on known results. In particular, convex tightness is not implied by the hypotheses of the theorems. It is shown that convex tightness is preserved when random functions are centered, and this result is applied to improve some known strong laws for weighted sums in D(0,1). A weak law of large numbers is proved using a new pointwise condition on the first moments and some weak laws for weighted sums are improved upon by weakening the hypotheses. A study is made of relationships among several conditions on X sub n which appear as hypotheses in laws of large numbers. (Author)

AD-A091 116/4 PC **A05**/MF **A01**
Naval Research Lab., Washington, DC.
Precise Analysis of an Optimal Perturbation Estimation and Control Problem.
Final rept.,
Warren W. Willman. 15 Sep 80, 82p Rept no. NRL-8406

A mathematically rigorous analysis is performed of a scalar discrete-time stochastic optimal control problem. This problem differs from the standard linear-quadratic-Gaussian one only by the presence of a quadratic term in the state and process noise with a small coefficient. A certain formal approximation to the optimal control is shown to converge asymptotically in probability to an optimal control with respect to this coefficient. (Author)

AD-A091 122/2 PC **A03**/MF **A01**
Stanford Univ., CA. Dept. of Computer Science.
Recent Developments in the Complexity of Combinatorial Algorithms.
Technical rept.,
Robert Endre Tarjan. Jun 80, 29p Rept no. STAN-CS-80-794
Contract N00014-76-C-0330, Grant NSF-MCS78-26858
Presented at the IBM Symposium on Foundations of Computer Science (5th), Hakone, Japan, 26-28 May 80.

Several major advances in the area of combinatorial algorithms include improved algorithms for matrix multiplication and maximum network flow, a polynomial-time algorithm for linear programming, and steps toward a polynomial-time algorithm for graph isomorphism. This paper surveys these results and suggests directions for future research. Included is a discussion of recent work by the author and his students on dynamic dictionaries, network flow problems, and related questions.

AD-A091 123/0 PC **A03**/MF **A01**
Stanford Univ., CA. Dept. of Computer Science.
Path-Regular Graphs.
Technical rept.,
David W. Matula, and Danny Dolev. Jun 80, 41p Rept no. STAN-CS-80-807
Contract N00014-76-C-0330, Grant NSF-MCS77-23738

A graph is vertex-(edge-)path-regular if a list of shortest paths, allowing multiple copies of paths, exists where every pair of vertices are the endvertices of the same number of paths and each vertex (edge) occurs in the same number of paths of the list. The dependencies and independencies between the various path-regularity, regularity of degree, and symmetry properties are investigated. We show that every connected vertex-(edge-)symmetric graph is vertex-(edge-)path-regular, but not conversely. We show that the product of any two vertex-path-regular graphs is vertex-path-regular but not conversely, and the iterated product GxGx...xG is edge-path-regular if and only if G is edge-path-regular. An interpretation of path-regular graphs is given regarding the efficient design of concurrent communication networks. (Author)

AD-A091 124/8 PC **A02**/MF **A01**
Stanford Univ., CA. Dept. of Computer Science.
Lower Bounds for Algebraic Decision Trees.
Technical rept.,
J. Michael Steele, and Andrew C. Yao. Jul 80, 14p Rept no. STAN-CS-80-810
Contract N00014-76-C-0475, Grant NSF-MCS77-05313

A topological method is given for obtaining lower bounds for the height of algebraic decision trees. The method is applied to the knapsack problem where an (Omega) (n squared) bound is obtained for trees with bounded-degree polynomial tests, thus extending the Dobkin-Lipton result for linear

trees. Applications to the convex hull problem and the distinct element problem are also indicated. Some open problems are discussed. (Author)

AD-A091 180/0 PC **A07**/MF **A01**
Stanford Univ., CA. Dept. of Computer Science.
Computational Uses of the Manipulation of Formal Proofs.
Doctoral thesis,
Christopher Alan Goad. Aug 80, 133p Rept no. STAN-CS-80-819
Contract MDA903-80-C-0102, ARPA Order-2494

This thesis concerns computational uses of the additional information contained in proofs, and efficient methods for the representation and transformation of proofs. An extended lambda-calculus is presented which allows compact expression of the computationally significant part of the information contained in proofs. Terms of the calculus preserve dependency data, but can be efficiently executed by an interpreter of the kind used for lambda-calculus based languages such as LISP. The calculus has been implemented on the Stanford Artificial Intelligence Laboratory PDP-10 computer. Results of experiments on the use of pruning transformations in the specialization of a bin-packing algorithm are reported.

AD-A091 182/6 PC **A02**/MF **A01**
Stanford Univ., CA. Dept. of Electrical Engineering.
Fast Time-Invariant Implementations for Linear Least-Squares Smoothing Filters,
Bernard Levy, Thomas Kailath, Lennart Ljung, and Martin Morf. 20 Mar 78, 7p AFOSR-TR-80-0808
Contracts F44620-74-C-0068, N00014-75-C-0601
Pub. in IEEE Transactions on Automatic Control, vAC-24 n5 p770-774 Oct 79.

No abstract available.

AD-A091 184/2 PC **A02**/MF **A01**
Stanford Univ., CA. Dept. of Electrical Engineering.
A New Algorithm to Perform LU Decomposition with Applications in 2-D Digital Filtering,
Ph. Delsarte, Y. Genin, and Y. Kamp. 1980, 5p AFOSR-TR-80-0807
Contracts F49620-79-C-0058, DAAG29-79-C-0215
Pub. in IEEE International Symposium on Circuits and Systems, Apr 80.

No abstract available.

AD-A091 202/2 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Lab. for Information and Decision Systems.
Convergence Studies of Adaptive Control Algorithms. Part I: Analysis,
C. Rohrs, L. Valavani, and M. Athans. 1980, 6p LIDS-P-1032, AFOSR-TR-80-1015-PT-1
Grant AFOSR-77-3281
Pub. in Proceedings of the IEEE Conference on Decision and Control, Albuquerque, New Mexico, Dec 80, p1-4.

No abstract available.

AD-A091 307/9 PC **A03**/MF **A01**
Center for Naval Analyses, Alexandria, VA. Naval Warfare Analysis Group.
On the WKB Approximation to the Propagator for Arbitrary Hamiltonians.
Professional paper,
Maurice M. Mizrahi. Aug 80, 28p Rept no. CNA-PP-286

The purpose of this paper is to obtain a general expression for the WKB approximation to the propagator corresponding to an arbitrary Hamiltonian operator. In an earlier publication we determined a range of validity of Van Vleck's well-known formula, which was known not to be universally valid. The approximation derived here, generalizing Van Vleck's formula, is also valid beyond quantum-mechanical applications such as the Fokker-Planck equation for diffusion processes. We operate in n dimensions and summation over repeated indices is implied.

AD-A091 343/4 PC **A03**/MF **A01**
Purdue Univ., Lafayette, IN. School of Industrial Engineering.
Random Variate Generation: A Survey.
Research memo.,
Bruce W. Schmeiser. Jun 80, 28p Rept no. RM-80-06
Contract N00014-79-C-0832

The state of the art of generating random variates on a digital computer is surveyed. General concepts are presented, followed by criteria for comparing algorithms. The literature is surveyed for continuous univariate, discrete univariate, continuous multivariate, and discrete multivariate distributions, as well as point processes, time series, order statistics and geometrically inspired problems. An extensive list of references is provided. (Author)

AD-A091 346/7 PC **A02**/MF **A01**
Naval Ocean Systems Center, San Diego, CA.
A Least Squares Adaptive Lattice Equalizer Algorithm.
Technical rept. Oct 78-Sep 79,
E. H. Satorius, and J. D. Pack. 2 Sep 80, 23p Rept no. NOSC/TR-575

In many applications of adaptive data equalization, rapid initial convergence of the adaptive equalizer is of paramount importance. Apparently the fastest known equalizer adaptation algorithm is based on a least squares estimation algorithm. The least squares algorithm, which is a special case of the Kalman estimation algorithm, was first applied to channel equalization by Godard in a seminal paper. One disadvantage with the Godard algorithm is that the complexity, i.e., number of additions and multiplications, of the algorithm grows quadradically with the number of filter coefficients. Recently, however, Morf, Ljung, Lee and others have shown how the complexity of the conventionally implemented least squares algorithms (e.g., Godard's algorithm) can be made to grow only linearly with the number of filter coefficients. Furthermore, these computationally simpler least squares algorithms may be implemented either in tapped delay line or lattice form. The application of the tapped delay line form, i.e., the fast Kalman algorithm, to channel equalization has been considered recently by Falconer and Ljung. In this paper, it is shown how the least squares lattice algorithms originally introduced by Morf and Lee can be adapted to the equalizer adjustment algorithm. The extremely rapid start up convergence properties of the least squares lattice equalizer are confirmed by computer simulation. (Author)

AD-A091 360/8 PC **A02**/MF **A01**
Michigan Univ Ann Arbor Dept of Mathematics
Numerical Solution of Partial Differential Equations.
Interim rept. no. 1, 1 Jul 79-30 Jun 80,
L. Ridgway Scott. Sep 80, 7p AFOSR-TR-80-1014
Contract F49620-79-C-0149

Several problems relevant in the application of mechanics to real-world problems were treated. The work included theoretical analysis of solutions of partial differential equations, detailed studies of numerical techniques for approximately solving differential equations arising in mechanics, as well as actual numerical computations using such numerical schemes to model experimental phenomena. Application areas impacted by this research include heat conduction and fluid mechanics. Also closely related are problems arising in the study of controlled fusion. In addition, the work has added significantly to theoretical understanding of numerical methods for solving various partial differential equations. (Author)

AD-A091 361/6 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Lab. for Information and Decision Systems.
Optimal Infinite-Horizon Undiscounted Control of Finite Probabilistic Systems,
Loren K. Platzman. 31 May 79, 21p AFOSR-TR-80-1018
Grants AFOSR-77-3281, AFOSR-72-2273
Pub. in SIAM Jnl. of Control and Optimization, v18 n4 p362-380 Jul 80.

No abstract available.

AD-A091 362/4 PC **A02**/MF **A01**
Texas Univ. at Austin. Dept. of Electrical Engineering.
Detection of Abnormal Behavior via Nonparametric Estimation of the Support,
Luc P. Devroye, and Gary L. Wise. 27 Feb 78, 12p AFOSR-TR-80-1011
Grant AFOSR-76-3062
Pub. in SIAM Jnl. on Applied Mathematics, v38 n3 p480-488 Jun 80.

No abstract available.

AD-A091 364/0 PC **A02**/MF **A01**
Illinois Univ. at Urbana-Champaign. Coordinated Science Lab.
A Control Problem with Structural Choices,
G. P. Papavassilopoulos, and J. B. Cruz, Jr. 1979, 11p AFOSR-TR-80-1019
Contract N00014-79-C-0424, Grant AFOSR-78-3633
Pub. in Jnl. of the Franklin Institute, v309 n3 p135-144 Mar 80.

No abstract available.

AD-B040 229/7 PC **A06**/MF **A01**
Army Armament Research and Development Command, Aberdeen Proving Ground, MD. Ballistics Research Lab.
A Manual for General Least Squares Model Fitting.
Technical rept.,
Aivars Celmins. Jun 79, 113p ARBRL-TR-02167, SBIE-AD-E430278
Distribution limitation now removed.

This manual outlines the theory of general least squares model fitting and describes the operation of four computer programs for model fitting by a least squares method. The distinct features of the programs are that they are applicable to problems where the constraints (models) are nonlinear equalities, that they take into consideration the accuracy of data and correlations between them, and that they compute variance estimates using complete formulas. The four programs are: COLSAC - for nonlinear curve fitting; COLSMU - for problems with constraints in form of simultaneous nonlinear equations; COLSAV - for computation of vector averages from correlated data; TALSAC - for problems involving nonlinear transformations of variables.

NBI-HE-79-31 PC **A03**/MF **A01**
Niels Bohr Inst., Copenhagen (Denmark).
Geometric Approach to Soliton Equations.
R. Sasaki. Sep 79, 28p
U.S. Sales Only.

A class of nonlinear equations that can be solved in terms of nxn scattering problem is investigated. A systematic geometric method of exploiting conservation laws and related equations, the so-called prolongation structure, is worked out. The nxn problem is reduced to n/sub n-1/x(n-1) problems and finally to 2x2 problems, which have been comprehensively investigated recently by the author. A general method of deriving the infinite numbers of polynomial conservation laws for an nxn problem is presented. The cases of 3x3 and 2x2 problems are discussed explicitly. (Atomindex citation 11:514941)

N81-10769/0 PC **A03**/MF **A01**
Limoges Univ. (France). Lab. d'Electronique des Microondes.
Approximation and Synthesis of Certain Classes of Microwave Filters Approximations et Syntheses de Certaines Classes de Filtres Microondes.
Final Report.
P. Jarry. Apr 80, 45p ERA-535
Contract DGRST-75-7-0696
Text in French.

Optimized amplitude and phase transfer functions were defined and studied in order to realize linear phase resonant line filters. A systematic study of linear phase generalized polynomials (Bessel and Jacobi) is presented together with their applications to nonminimum phase transfer functions. A nonreciprocal synthesis method is given. A new class of orthogonal polynomials (intermediate polynomials) is introduced and rigorously studied from the mathematical point of view. Some practical applications of these polynomials are given.

N81-10778/1 PC **A04**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Backward Deletion to Minimize Prediction Errors in Models from Factorial Experiments with Zero to Six Center Points.
A. G. Holms. 14 Aug 80, 63p NASA-TM-81524, E-475
Presented at the 140TH Annual Meeting of the AM. Statist. Assoc., Houston, Texas, 11-14 Aug. 1980.

Population model coefficients were chosen to simulate a saturated 2 to the fourth power fixed effects experiment having an unfavorable distribution of relative values. Using random number studies, deletion strategies were compared that were based on the F distribution, on an order statistics distribution of Cochran's, and on a combination of the two. Results of the comparisons and a recommended strategy are given.

N81-10789/8 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Stability Boundaries for Systems with Frequency-Model Feedback and Complacency Filter.
L. K. Barker. Nov 80, 43p NASA-TP-1744, L-13787

General parameter-plane equations were derived to generate boundaries for a class of systems characterized by a feedback loop that contains a complementary filter and a model for either the low- or high-frequency portion of the plant. This combination allows those frequencies of the part of the plant that is modeled to be fed back for control while suppressing other frequencies. For all specific examples considered, the stability regions obtained using the complementary filter and frequency model were larger (and in some cases, considerably larger) than those obtained using a low pass filter in the feedback of the system output. Furthermore, higher gain control was possible.

N81-10793/0 PC **A02**/MF **A01**
Transkei Univ., Umtata (South Africa).
Banach Ideals of Operators Defined by Classes of Cone Absolutely Summing and Strongly Majorizing Mappings.
J. J. Conradie, and J. Swart. Nov 79, 8p CSIR-TWISK-129

The ideals of absolutely delta summing and dual absolutely delta summing mappings are characterized as 'quotients' by continuous linear mappings of certain classes of cone absolutely summing and strongly majorizing mappings respectively. The ideals of delta nuclear and right delta nuclear maps are also characterized as products of these two classes of operators with the class of continuous linear mappings. Two propositions are presented which suggest a way of generalizing the notions of absolutely delta summing and delta nuclear mappings.

N81-10794/8 PC **A03**/MF **A01**
National Research Inst. for Mathematical Sciences, Pretoria (South Africa).
On Schwartz Operator Ideals Determined by the Orde.-Bounded Sets in a Banach Lattice.
J. Swart, and J. J. Conradie. Jan 80, 33p CSIR-TWISK-138

The p-nuclear operators are characterized as those operators factoring through l(p) for which one factor is strongly majorizing. Likewise the applications of p-nuclear are characterized as those l(p) factorizable operators for which one factor is cone absolutely summing. Results are obtained in the general setting of Schwartz operator ideals, and consequently it is possible to generalize the notions 'p-nuclear' and 'absolutely p-summing' to 'H-nuclear' and 'absolutely H-summing', where H is an arbitrary Banach lattice.

12B. Operations Research

AD-A090 989/5 PC **A02**/MF **A01**
Michigan Univ., Ann Arbor. Computer, Information and Control Engineering.
Decomposition and Customer Streams of Feedback Networks of Queues in Equilibrium,
Frederick J. Beutler, and Benjamin Melamed.
Sep 76, 17p AFOSR-TR-80-0805
Grant AFOSR-76-2903
Pub. in Operations Research, v26 n6 p1059-1072 Dec 78.

No abstract available.

AD-A091 036/4 PC **A03**/MF **A01**
Delaware Univ., Newark. Applied Mathematics Inst.
Asymptotic Behavior of the Stationary Distributions in the GI/PH/c Queue with Heterogeneous Servers.
Interim rept.,
Marcel F. Neuts, and Yukio Takahashi. May 80, 26p TR-57B, AFOSR-TR-80-0988
Grants AFOSR-77-3236, NSF-ENG79-08351

This paper deals with the stable c-server queue with renewal input. The service time distributions may be different for the various servers. They are however all probability distributions of phase type. It is shown that the stationary distribution of the queue length at arrivals has an exact geometric tail of rate n, $0 < n < 1$. It is further shown that the stationary waiting time distribution at arrivals has an exact exponential tail of decay parameter $xi > 0$. The quantities n and xi may be evaluated together by an elementary algorithm. For both distributions, the multiplicative constants which arise in the asymptotic forms may be fully characterized. These constants are however difficult to compute in general. (Author)

AD-A091 099/2 PC **A02**/MF **A01**
Delaware Univ., Newark. Applied Mathematics Inst.
Efficient Algorithmic Solutions to Exponential Tandem Queues with Blocking,
Guy Latouche, and Marcel F. Neuts. 20 Sep 78, 15p AFOSR-TR-80-0802
Grant AFOSR-77-3236
Pub. in SIAM Jnl. Alg. Disc. Meth., v1 n1 p93-106 Mar 80.

No abstract available.

AD-A091 101/6 PC **A02**/MF **A01**
Delaware Univ., Newark. Applied Mathematics Inst.
Exponential Servers Sharing a Finite Storage: Comparison of Space Allocation Policies,
Guy Latouche. 15 Jun 78, 7p AFOSR-TR-80-0801
Grant AFOSR-77-3236
Pub. in IEEE Transactions on Communications, vCOM28 n6 p910-915 Jun 80.

No abstract available.

AD-A091 127/1 PC **A04**/MF **A01**
George Washington Univ., Washington, DC. Program in Logistics.
Program Description and User's Guide for ZIPCAP -- A Zero-One Integer Program to Solve Multiactivity Multifacility Capacity-Constrained Assignment Problems.
Scientific rept.,
Krishan L. Chhabra, and Richard M. Soland. 1 Jul 80, 70p Rept no. SERIAL T-423
Contract N00014-75-C-0729

ZIPCAP is a zero-one integer program developed to solve multiactivity multifacility capacity/constrained assignment problems. The objective in such problems is an assignment that minimizes the sum of the variable costs and fixed costs. This document describes ZIPCAP and provides guidelines for its use. Illustrative areas of application, program options, and test problems are included. (Author)

AD-A091 187/5 PC **A05**/MF **A01**
Stanford Univ., CA. Dept. of Computer Science.
Expression Procedures and Program Derivation.
Doctoral thesis,
William Louis Scherlis. Aug 80, 99p Rept nos. STAN-CS-80-818, AIM-341
Contract N00014-76-C-0687

We explore techniques for systematically deriving programs from specifications. The goal of this exploration is a better understanding of the development of algorithms. Thus, the intention is not to develop a theory of programs, concerned with the analysis of existing programs, but instead to develop a theory of programming, dealing with the process of constructing new programs. Such a theory would have practical benefits both for programming methodology and for automatic program synthesis. We investigate the derivation of programs by program transformation techniques. By expanding an ordinary language of recursion equations to include a generalized procedure construct (the expression procedure), our ability to manipulate programs in that language is greatly facilitated. The expression procedure provides a means of expressing information not just about the properties of individual program elements, but also about the way they relate to each other. A set of three operations -- abstraction, application, and composition -- for transforming programs in this extended language is presented. We prove using operational semantics that these operations preserve the strong equivalence of programs. The well-known systems of Burstall and Darlington and of Manna and Waldinger are both based on an underlying rule system that does not have this property.

AD-A091 215/4 PC **A03**/MF **A01**
Texas Univ. at Austin. Center for Cybernetic Studies.
Recent Developments in Computer Implementation Technology for Network Flow Algorithms,
Fred Glover, and Darwin Klingman. Jul 80, 36p Rept no. CCS-377
Contracts N00014-80-C-0242, N00014-78-C-0222

The application of computer implementation technology to network optimization has brought about unprecedented advances in solution efficiency. The remarkable gains of the early to mid 1970's for solving transportation and transhipment problems are widely known, enabling network codes to outperform LP codes by two orders of magnitude for these problems. The pioneering study by Gilsinn and Witzgall demonstrated that effective use of computer implementation technology could reduce solution times for shortest path problems from one minute to slightly more than one second, using the same general shortest path algorithm, computer, and compiler. The momentum launched by these studies has not dwindled, but continues into the present. New advances in all areas of network optimization have recently superseded the procedures previously found to be best. Latest computer implementations clearly outstrip the best codes of the recent past as our understanding of the important relation between algorithmic design and implementation continues to grow. We undertake to report on some of the major computer implementation studies of the past few years and to present preliminary results on the new developments. (Author)

AD-A091 216/2 PC **A02**/MF **A01**
Texas Univ. at Austin. Center for Cybernetic Studies.
An Algorithm for a Least Absolute Value Regression Problem with Bounds on the Parameters.
Research rept.,
Ronald Armstrong, and Mabel Kung. Jun 80, 23p Rept no. CCS-378
Contracts N00014-75-C-0569, N00014-80-C-0242

This paper presents a special purpose linear programming algorithm to solve a least absolute value regression problem with upper and lower bounds on the parameters. The algorithm exploits the problem's special structure by maintaining a compact representation of the basis inverse and by allowing for the capability to combine several simplex iterations into one. Computational results with a computer code implementation of the algorithm is given. (Author)

AD-A091 312/9 PC **A03**/MF **A01**
Texas Univ. at Austin. Center for Cybernetic Studies.
A Successive Shortest Path Algorithm for the Assignment Problem.
Research rept.,
Michael Engquist. Aug 80, 34p Rept no. CCS-375
Contracts N00014-75-C-0569, N00014-80-C-0242

In this paper a new successive shortest path (SSP) algorithm for solving the assignment problem is introduced. A computer implementation of this algorithm has been developed and a discussion of the details of this implementation is provided. Computational results are presented which show this implementation of SSP to be substantially more efficient than several recently developed codes including the best primal simplex code. Also, some new theoretical results are presented which are useful in the implementation of SSP, and it is shown that the algorithm has a computational bound of O(n3), where n is the number of origins. (Author)

COO-1340-77 PC **A03**/MF **A01**
Colorado State Univ., Fort Collins. Dept. of Atmospheric Science.
Concept of a (1- alpha) Performance Confidence Interval.
H. H. Leong, G. R. Johnson, and T. N. Bechtel. 1980, 28p CONF-801049-1
Contract AS02-76EV01340
1980 international conference of cybernetics and systems, Cambridge, MA, USA, 8 Oct 1980.

A multi-input, single-output system is assumed to be represented by some model. The distribution functions of the input and the output variables are considered to be at least obtainable through experimental data. Associated with the computer response of the model corresponding to given inputs, a conditional pseudoresponse set is generated. This response can be constructed by means of the model by using the simulated pseudorandom input variates from a neighborhood defined by a preassigned probability allowance. A pair of such pseudoresponse values can then be computed by a procedure corresponding to a (1- alpha) probability for the conditional pseudoresponse set. The range defined by such a pair is called a (1- alpha) performance confidence interval with respect to the model. The application of this concept can allow comparison of the merit of two models describing the same system, or it can detect a system change when the current response is out of the performance interval with respect to the previously identified model. 6 figures. (ERA citation 05:037455)

N81-10729/4 PC **A07**/MF **A01**
European Space Agency, Paris (France).
Nonlinear Programming. Foundations, Techniques, Examples.
D. Kraft. Feb 80, 146p ESA-TT-572, DLR-FB-77-68
Transl. Into English of "Nichtlineare Programmierung - Grundlagen, Verfahren, Beispiele", Rept. Dlr-FB-77-68 Dfvlr, Oberpfaffenhofen (Germany, F.R.). Mar. 1978. Original Report in German Previously Announced as N79-30980. Original German Report Available from Dfvlr, Cologne Dm 47,30.

Methods of nonlinear programming are compared and a synopsis is given of necessary and sufficient conditions for optimal solutions. The coherence of the algorithms is emphasized, and their differences (e.g., determination of search direction) are exposed. Some of the most efficient techniques are compared on the basis of two standard test examples taken from the mathematical programming literature. The computation of optimal control functions for a high performance aircraft by a computer program, in which generalized penalty functions are implemented, is given as an example for the solution of complex realistic problems. The FORTRAN implementation of the generalized penalty function algorithm is presented in an appendix.

13.

MECHANICAL, INDUSTRIAL, CIVIL, AND MARINE ENGINEERING

13A. Air Conditioning, Heating, Lighting, and Ventilating

AERE-M-3032 PC **A02**/MF **A01**
UKAEA Atomic Energy Research Establishment, Harwell (England). Chemistry Div.
Simple Air-Cooled Reflux Condenser for Laboratory Use.
K. A. Boult. Oct 79, 9p
U.S. Sales Only.

This Memorandum describes the design of a simple compact air-cooled reflux condenser suitable for gloveboxes, cells or other locations where the provision of cooling water presents a problem. In a typical application the condenser functioned satisfactorily when used to condense water from a flask heated by a 100 watt mantle. There was no measurable loss of water from the boiling flask in 100 hours. (Atomindex citation 11:525720)

CONF-800966-1 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Performance and Economics of Using Heat Pump Desuperheaters for Residential Water Heating.
L. A. Abbatiello, and Ballou, M. L. Nephew. 1980, 14p
Contract W-7405-ENG-26
Conference on waste heat recovery for energy conservation: residential and light commercial heat pumps, West Lafayette, IN, USA, 15 Sep 1980.

The efficiencies and economics of three methods of water heating are compared, i.e., desuperheater and conventional gas and electric water heaters. The homeowner using a desuperheater water heater system should expect effective annual water heating COPs which range from 1.3 for northern cities to 2.9 in southern cities. The average consumer could expect to save between 800 and 2500 kWh/year if he is presently heating water with a conventional electric water heater. Should the homeowner elect to install a heat pump water heater within the thermal envelope of his air-to-air heat pumped home, he could expect similar savings. Even though the consumer can achieve significant energy savings, these savings may not translate into significantly different life cycle economics. The major economic conclusions of this study are: the desuperheater water heater can save a significant amount of energy at attractive life-cycle costs and acceptable first costs if the owner is choosing between electrically powered alternatives; heat pump water heaters offer savings which are comparable to those of the desuperheater system in all regions of the country; water heating with natural gas still offers the lowest first and life-cycle costs of all alternatives. (ERA citation 05:036823)

CONF-800972-1 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Reflective Insulating Blinds for Window Applications.
H. B. Shapira. 1980, 11p
Contract W-7405-ENG-26
1980 Department of Energy passive and hybird solar energy program update meeting, Washington, DC, USA, 21 Sep 1980.

A growing number of designs for direct-gain space heating are currently offered to the public. While these work well in some cases, side-effects of direct solar radiation provide some obstacles to wide acceptance of these designs. A novel-type blind which will improve the performance of direct-gain space heating is being developed at Oak Ridge National Laboratory. The background leading to the conception of RIB (Reflective Insulating Blinds unit) is discussed. Technical considerations are discussed covering issues such as: sizing, material selection, mounting mechanism and mode, operation controls, applications, and general design features. A discussion on commercialization efforts is presented. (ERA citation 05:036808)

COO-4094-89 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Analytical Predictions of Liquid and Air Photovoltaic/Thermal Flat-Plate Collector Performance.
P. Raghuraman, and S. D. Hendrie. 1980, 8p
CONF-801102-23
Contract AC02-76ET20279
ASME winter annual meeting, Chicago, IL, USA, 16 Nov 1980.

Two separate one-dimensional analyses have been developed for the prediction of the thermal and electrical performance of both liquid and air flat-plate photovoltaic/thermal (PV/T) collectors. The analyses account for the temperature difference between the primary insolation absorber (the photovoltaic cells) and the secondary absorber (a thermal absorber flat plate). The results of the analyses are compared with test measurements, and therefrom, design recommendations are made to maximize the total energy extracted from the collectors. (ERA citation 05:036297)

DOE/EI/10509-T1 PC **A05**/MF **A01**
Social and Scientific Systems, Inc., Washington, DC.
Household Energy Demand: A Theoretic and Econometric Specification.
R. S. Brown, and M. L. Kwast. Jun 80, 89p
Contract AC01-79EI10509

One of the major concerns in assessing the impact of energy-conservation policy is the manner in which its impact is distributed across various segments of the population. Accurate assessment of these effects for any actual or proposed policy requires the existence and use of a model which estimates and simulates the response of households to energy policy changes. The Comprehensive Human Resources Data System (CHRDS) simulates these issues. The approach starts with a large sample survey of households and projects the sample to a future year with an updating of demographic, economic, and energy-using characteristics. Energy expenditures change over time as a function of prices directly, consumption changes induced by price changes, conversions of heating and water-heating fuel type, appliance ownership, appliance efficiency, the age and distribution of housing stock, insulation efficiency, auto ownership patterns, and the economic and demographic characteristics of the population. This paper develops the required theoretical model of household energy demand and presents an appropriate econometric specification. Section II presents the basic model of household energy demand proposed for estimation with the National Interim Energy Consumption Survey (administered to 3000 households in 1978-1979). Section III proposes explicit forms for the demand equations and presents the econometric specifications. Section IV discusses the incorporation of the proposed model into the existing CHRDS model. Section V outlines how the model could be extended to deal with the long run, while Section VI reviews the advantages of the proposed model over most other formulations, and then discusses ways in which the proposed model could be generalized and extended. (ERA citation 05:035075)

N81-10518/1 PC **A05**/MF **A01**
Security State Bank, Starkville, MS.
Solar Heating System at Security State Bank, Starkville, Mississippi.
Final Report.
Aug 80, 95p NASA-CR-161550

Contract EM-78-F-01-5198
Sponsored by NASA. Marshall Space Flight Center.

The 312 square feet of Solaron flat plate air collectors provide for 788 square feet of space heating, an estimated 55 percent of the heating load. Solar heated air is distributed to the 96 cubic foot steel cylinder, which contains two inch diameter rocks. An air handler unit moves the air over the collector and into the steel cylinder. Four motorized dampers and two gravity dampers are also part of the system. A Solaron controller which has sensors located at the collectors, rock storage, and at the return air, automatically controls the system. Auxiliary heating energy is provided by electric resistance duct heaters.

N81-10519/9 PC **A02**/MF **A01**
Days Inn of America, Inc., Atlanta, GA.
Solar Hot Water System Installed at Day's Lodge, Atlanta, Georgia.
Final Report.
Sep 80, 23p NASA-CR-161559
Contract EG-77-G-01-1632
Sponsored by NASA. Marshall Space Flight Center.

The solar energy hot water system installed in the Days Inns of America, Inc., Atlanta, Georgia is described. This system provides for 81 percent of the total hot water demand. There are two separate systems, each serving one building of the lodge (total of 65 suites). The entire system contains only potable city water. The 1024 square feet of Grumman Sunstream Model 332 liquid flat plate collectors and the outside piping drain whenever the collector plates approach freezing or when power is interrupted. Solar heated water from the two above ground cement lined steel tanks (1000 gallon tank) is drawn into the electric Domestic Hot Water (DHW) tanks as hot water is drawn. Electric resistance units in the DHW tanks top off the solar heated water, if needed, to reach thermostat setting.

N81-10520/7 PC **A06**/MF **A01**
Shoney's South, Inc., Memphis, TN.
Solar Heating and Hot Water System Installed at Shoney's Restaurant, North Little Rock, Arkansas.
Final Contractor Report.
Aug 80, 123p NASA-CR-161557
Contract EM-78-F-01-5188

A solar heating system designed to supply a major portion of the space and water heating requirements for a restaurant is described. The restaurant has a floor space of approximately 4,650 square feet and requires approximate 1500 gallons of hot water daily. The solar energy system consists of 1,428 square feet of Chamberlain flat plate liquid collector subsystem, and a 1500 gallon storage subsystem circulating hot water producing 321 x 10 to the 6th power Btu/Yr (specified) building heating and hot water heating.

N81-10521/5 PC **A03**/MF **A01**
Days Inn of America, Inc., Atlanta, GA.
Solar Hot Water System Installed at Day's Inn Motel, Dallas, Texas (Valley View).
Final Contractor Report.
Sep 80, 47p NASA-CR-161570
Contract EG-77-G-01-1632

The solar system was designed to provide 65 percent of the total domestic hot water (DHW) demand. A liquid (water) flat plate collector (1,000 square feet) system automatically drains into the 1,000 gallon steel storage tank when the solar pump is not running. Heat is transferred from the DHW tanks through a shell and tube heat exchanger. A circulating pump between the DHW tanks and heat exchanger enables solar heated water to help make up standby losses. All pumps are controlled by differential temperature controllers.

N81-10522/3 PC **A03**/MF **A01**
Days Inn of America, Inc., Atlanta, GA.
Solar Hot Water System Installed at Day's Inn Motel, Savannah, Georgia.
Final Contractor Report.
Sep 80, 44p NASA-CR-161561
Contract EG-77-G-01-1632

The Solar System was designed to provide 50 percent of the total Domestic Hot Water (DHW) demand. Liquid Flat Plate Collectors (900 square feet) are used for the collector subsystem. The collector subsystem is closed loop, using 50 percent Ethylene Glycol solution antifreeze for freeze protection. The 1,000 gallon fiber glass storage tank contains two heat exchangers. One of the heat exchangers heats the storage tank with the collector solar energy. The other heat exchanger preheats the cold supply water as it passes through on the way to the Domestic Hot Water (DHW) tank heaters. Electrical energy supplements the solar energy for the DHW. The Collector Mounting System utilizes guy wires to structurally tie the collector array to the building.

N81-10523/1 PC **A03**/MF **A01**
Days Inn of America, Inc., Atlanta, GA.
Solar Hot Water System Installed at Days Inn Motel, Jacksonville, Florida.
Final Contractor Report.
Sep 80, 32p NASA-CR-161560
Contract EG-77-G-01-1632

The solar system was designed to provide 65 percent of the hot water demand. Water in the liquid flat plate collector (900 square feet) system automatically drains into the 1000 gallon lined and vented steel storage tank when the pump is not running. Heat is transferred from storage to Domestic Hot Water (DHW) tanks through a tube and shell heat exchanger. A circulating pump between the DHW tanks and heat exchanger enables solar heated water to help make up DHW standby losses. All pumps are controlled by differential temperature.

N81-10524/9 PC **A03**/MF **A01**
Days Inn of America, Inc., Atlanta, GA.
Solar Hot Water System Installed at Days Inn Motel, Dallas, Texas (Forrest Lane).
Final Report.
Sep 80, 47p NASA-CR-161569
Contract EG-77-G-01-1632
Sponsored by NASA. Marshall Space Flight Center.

The solar system was designed to provide 65 percent of the total Domestic Hot Water (DHW) demand. The liquid flat plate (water) collector (1,000 square feet) system automatically drains into the 1,000 gallon steel storage tank located in the mechanical room when the pump is not running. Heat is transferred from the storage tank to DHW tanks through a tube and shell heat exchanger. A circulating pump between the DHW tanks and the heat exchanger enables solar heated water to help make DHW tank standby losses. All pumps are controlled by differential temperature.

N81-10530/6 PC **A05**/MF **A01**
ARCAED, London (England).
Investigation of Passive Heating and Cooling Work in Europe.
Final Report.
R. M. Lebens, B. Arch, and H. J. Birch. 1980, 78p EUR-6695-EN

A brief history is given of passive solar work. Definitions of passive solar design systems, available passive solar design methods, monitoring, and meteorological data for passive solar work are discussed. Passive solar research in Europe as well as passive solar buildings in Europe are included.

N81-10564/5 PC **A02**/MF **A01**
von Karman Inst. for Fluid Dynamics, Rhode-Saint-Genese (Belgium).
System Modeling Using TRNSYS Computer Simulation.
N. Connor. 1980, 23p VKI-PREPRINT-1980-11
Submitted for Publication. Presented at Vki Lecture Ser. On Heat Exchange and Solar Energy, Rhode-Saint-Genese, Belgium, 28 Jan. - 1 Feb. 1980.

The TRNSYS program contains a collection of mathematical models of solar thermal systems components as separate modules, and is used as a comprehensive tool to simulate and predict system performance when the operating conditions vary continuously with time. An example showing the simulated performance of a swimming pool solar heating system is presented.

ORNL/Sub-7556/2 PC **A03**/MF **A01**
Stevens Inst. of Tech., Hoboken, NJ. Dept. of Materials and Metallurgical Engineering.
Corrosion Testing of Urea-Formaldehyde Foam Insulating Material.
R. Weil, A. Graviano, and K. Sheppard. Sep 80, 38p
Contract W-7405-ENG-26

Two tests of the corrosiveness of urea-formaldehyde (UF) foam insulating materials were compared. One test, the Timm test, had test coupons foamed in place. In the second, the Canadian test, blocks of foam already set were placed in contact with test coupons. The Timm test uses 10 gage thick coupons, while the Canadian test specifies 3 mil thick ones. Two samples of UF foam were tested by the Timm and the Canadian tests. The electrical-resistance probes showed that the corrosion rate against steel was initially quite high, of the order of 12 to 20 mpy (mils per year). After about 20 days, the rate was almost zero. In the Timm test, the corrosion rates of steel coupons were of the order to 0.5 to 2 mpy when averaged over the 28 or 56 day test period. The greater corrosion rate of the thick coupons in the Canadian test as well as poor reproducibility of the corrosion rates was attributed primarily to variations in the contact areas between the sample and the UF foam. The corrosion rates of galvanized steel coupons in the Canadian test in several cases exceeded the failure value. In the Timm test, the corrosion rates averaged over the whole test period were quite low. The corrosion rates of copper and aluminum in both tests were quite low. On the basis of the results of this study the following recommendations for a corrosion-test procedure for UF foam were made: two corrosion tests should be conducted, one for foam while curing and one after it has stabilized; the Timm test for corrosiveness while curing should be used, but for only 1 to 2 days; the test for corrosiveness after stabilizing should be of the accelerated type such as the Canadian one. To insure a constant-contact area, thicker coupons should be used; and the coupons for both tests should have a controlled part of the area not in contact with the foam to simulate field conditions. (ERA citation 05:036815)

PB81-114480 PC **A05**/MF **A01**
Swedish Council for Building Research, Stockholm.
A Solar Heating Plant in Studsvik: Design and First-Year Operational Performance,
Rutger Roseen, and Bengt Perers. 1980, 98p ISBN-91-540-3265-2

Group solar heating plants offer one of the most promising ways of economically utilizing solar energy for space heating purposes. A relatively advanced prototype installation has been built at Studsvik on the Swedish east coast south of Stockholm. The installation is based on a cheap, excavated and insulated water store with a floating insulating cover. The solar collectors are mounted on the cover, which turns to track the sun. This increases the efficiency of the concentrating collectors by between 30 and 50 percent. The heat is used as the sole heat source for an adjacent office building, designed for low-temperature heating.

PB81-114514 PC **A04**/MF **A01**
Swedish Council for Building Research, Stockholm.
Draft Program of Research and Development on Energy Conservation in Small and Medium Sized Oil Fired Boilers,
Poul H. Rasmussen. 1980, 51p ISBN-91-540-3313-6, D30:1980

This investigation is concerned with the economics and performance of smaller oil-fired heating installations. The objective is to identify feasible and reasonable fuel conservation measures and to propose research and investigatory work which can provide a basis for decisions on concrete measures in individual installations.

PB81-123564 PC **A04**/MF **A01**
National Bureau of Standards, Washington, DC.

Procedures for Testing, Rating, and Estimating the Seasonal Performance of Engine-Driven Heat Pump Systems,
B. R. Maxwell. Sep 79, 61p NBSIR-79-1911
Sponsored in part by Department of Energy, Washington, DC.

A generic test and rating procedure is developed for heat engine-driven air-to-air heat pump systems. The procedures are classified according to whether the systems have single-speed, two-speed, or variable-speed capability, and whether they are operating in the heating or cooling mode. The test requirements generally consist of a series of steady-state tests to establish the impact of outdoor temperature on performance, two or more part-load (cyclic) tests to determine the effect of 'on-off' cycling, two steady-state intermediate speed tests to determine part-speed performance, and a single frost accumulation test to estimate the effect of frost. A generalized calculation and rating procedure is developed. The system is rated in both modes based upon its steady-state performance at the ARI standard rating points, its seasonal performance factor, and its seasonal operating cost. A frost degradation coefficient is also established. The seasonal parameters are based upon either a residential or commercial/industrial building application which is located in either a generalized northern or southern climate.

PB81-126013 PC **A10**/MF **A01**
Calspan Corp., Buffalo, NY.
Safety and Energy Conservation Potential of Retrofit Devices for Gas-Fired Appliances: Volume I.
Final rept. Aug 77-Dec 79,
D. E. Adams. Dec 79, 223p NYSERDA-80-8-1
See also Volume 2, PB81-126021. Sponsored in part by New York Gas Group.

This report gives the results of laboratory and field tests which evaluated the safety and energy conservation potential of approximately 20 add-on devices and modifications to gas-fired heating equipment. The results indicate that furnace derating and the use of electrically-operated automatic vent dampers can, on the average, reduce gas consumption for space heating by 8.1 percent and 6.7 percent respectively. The report emphasizes the importance of safety in retrofit applications, and the need for utilization of qualified contractors.

PB81-126021 PC **A06**/MF **A01**
Calspan Corp., Buffalo, NY.
Safety and Energy Conservation Potential of Retrofit Devices for Gas-Fired Appliances: Volume II.
Final rept. Aug 77-Dec 79,
D. E. Adams. Dec 79, 108p NYSERDA-80-8-2
See also Volume 1, PB81-126013. Sponsored in part by New York Gas Group.

This study covered laboratory and field tests which evaluated the safety and energy conservation potential of approximately 20 add-on devices and modifications to gas-fired heating equipment. Volume 2 includes test site selection guidelines, installation and maintenance guidelines, and data acquisition guidelines.

13B. Civil Engineering

AD-A090 821/0 PC **A06**/MF **A01**
Army Engineer Waterways Experiment Station, Vicksburg, MS. Hydraulics Lab.
Utilization of Filter Fabric for Streambank Protection Applications.
Final rept. Feb 78-Feb 79,
Malcolm Price Keown, and Elba A. Dardeau, Jr. Jul 80, 123p Rept no. WES/TR/HL-80-12

A survey of literature, CE field offices, and filter fabric manufacturers was made to obtain published and unpublished information and case histories on the use of filter fabric as a component of streambank protection works. Properly selected and placed filter fabric may be considered as a substitute for part or all of a granular filter under revetment for situations where granular filter bedding materials are not readily available or cost-effective. Other possible uses also are described. Available information on the currently specified methods of placing filter fabric is provided and cautions concerning its use are emphasized. Filter fabrics should not be used in lieu of granular filters on soils having more than 85 percent of material by weight passing the No. 200 sieve or in high energy environment. A glossary of basic terminology and a bibliography of relevant literature are included. (Author)

AD-A090 827/7 PC **A10**/MF **A01**
Birmingham Univ (England) Dept of Transportation and Environmental Planning
Flexible Pavement Analysis.
Final technical rept. Dec 78-May 80,
M. S. Snaith, D. McMullen, R. J. Freer-Hewish, and A. Shein. May 80, 211p
Grant DA-ERO-78-G-125

Part I describes the pavement analysis program DEFPAV. The development of pavement models for two sections of road is described in detail; they predict the values of transient deflection and rut depth growth. The use of the program in analyzing the effect of surface temperature on transient deflections is described. An investigation of the effect of crack propagation through a bituminous surface layer is also reported. Part II describes a method of overlay thickness selection for flexible pavements. A rational selection of bituminous overlay may be made with the aid of a transient deflection measurement and a single computational procedure which is suitable for use on a modern programmable calculation. (Author)

AD-A090 932/5 MF **A01**
New York State Dept. of Environmental Conservation, Albany.
National Dam Safety Program. Clark's Creek Watershed Project Site I (I.D. Number NY-718, Number 106B-4076) Susquehanna River Basin, Chenango County, New York. Phase I Inspection Report,
George Koch. 30 Sep 80, 88p
Contract DACW51-79-C-0001
Availability: Microfiche copies only.

The Clark's Creek Watershed Project Site I dam consists of an earth dam with a service spillway pipe passing through the embankment and an excavated auxiliary spillway passing around the eastern end of the dam. The dam consists of a compacted earth embankment which is 46 feet high, has a crest length of 1250 feet and a crest width of 16 feet. The upstream slope is 1 vertical on 3 horizontal with a 10 foot wide berm near the base of the slope. The downstream slope is 1 vertical on 2.5 horizontal. The crest and exposed slopes are covered with grass and crownvetch. An earth cutoff trench of varying depth and width keys the embankment into the foundation soils. The examination of documents and visual inspection of the Clark's Creek Site 1 Dam did not reveal conditions which constitute a hazard to human life or property. The total discharge capacity of the spillways is adequate to impound and safely discharge the floodwaters resulting from the Probable Maximum Flood (PMF).

AD-A090 933/3 MF **A01**
New York State Dept. of Environmental Conservation, Albany.
National Dam Safety Program. Lock 2 Dam at Mechanicville (I.D. Number NY 988) Upper Hudson River Basin, Rensselaer-Saratoga County, New York. Phase I Inspection Report,
George Koch. 30 Sep 80, 87p
Contract DACW51-79-C-0001
Availability: Microfiche copies only.

Examination of available documents and a visual inspection of the dam revealed several deficiencies which may affect the safety of the dam. There was serious leakage in the vicinity of one of the gates in the gatehouse section. The auxiliary spillway section had failed allowing a portion of the river to flow around the left end of the dam. In addition to these observed deficiencies, structural stability analyses performed for the main spillway section indicate that the structure is unstable when subjected to severe loading conditions such as ice loading or flood flows. Further analysis is required. These studies should include subsurface and structural investigations to obtain information about the condition of the structure and its foundation. This information should then be incorporated into a more detailed stability analysis. The spillway, not having sufficient discharge capacity for passing one-half the Probable Maximum Flood (PMF), is considered to be inadequate. For such a large storm event, a high tailwater condition would occur, resulting in the flooding of downstream hazard areas. Hence, dam failure from overtopping would not significantly increase the hazard to loss of life from that which would exist just before failure. Several other deficiencies were also noted on this structure. Among these were deteriorated concrete on the main spillway section, erosion at the east abutment, and minor sloughing at the west abutment. In addition, no emergency action plan exists for this structure.

AD-A090 934/1 MF **A01**
New York State Dept. of Environmental Conservation, Albany.
National Dam Safety Program. Ischua Creek Watershed Project, Site 4 (I.D. Number N.Y. 626) Allegheny River Basin, Cattaraugus Country, New York. Phase I Inspection Report,
Bent L. Thomsen, and Gary L. Wood. 10 Sep 80, 153p
Contract DACW51-79-C-0001
Prepared in cooperation with Thomsen Associates, Groton, NY.
Availability: Microfiche copies only.

The Ischua Creek Watershed Project Site 4 consists of an earth dam with a principal spillway outlet pipe passing from a reinforced concrete riser structure through the embankment and two grass lined earth auxiliary spillways passing around the north and south ends of the embankment. The examination of available engineering documents and visual inspection of the Ischua Creek Site 4 Dam did not reveal conditions which constitute a hazard to human life and property. The total discharge capacity of the combined principal and auxiliary spillways is adequate to impound and safely discharge the floodwater resulting from the Probable Maximum Flood, therefore, the spillway is deemed to be adequate.

AD-A090 935/8 MF **A01**
New York State Dept. of Environmental Conservation, Albany.
National Dam Safety Program. Waterloo Dam (I.D. Number NY 709), Oswego River Basin, Seneca County, New York. Phase I Inspection Report,
George Koch. 30 Sep 80, 143p
Contract DACW51-79-C-0001
Availability: Microfiche copies only.

The Waterloo Dam is a concrete dam with four tainter gates and two concrete overflow sections. Lock 4 of the Cayuga-Seneca Canal is at the eastern end of the dam. There is an abandoned canal at the western end of the dam which may function as an overflow channel. The dam is a total of 241 feet long and is a maximum of 10 feet high. It is divided into 6 bays each of which has an opening of 36 feet. Examination of available documents and a visual inspection of the dam did not reveal conditions which constitute an immediate hazard to human life or property. However, the dam has some deficiencies which require further investigations and remedial work. The spillway does not have sufficient capacity to discharge the peak outflow from one-half the Probable Maximum Flood (PMF). For this storm event, high discharges will cause damage in the channel downstream of the dam. However, dam failure would not significantly increase the hazard to loss of life downstream from that which would exist just prior to an overtopping-induced failure.

AD-A090 936/6 MF **A01**
New York State Dept. of Environmental Conservation, Albany.
National Dam Safety Program. Windover Dam (I.D. Number NY 150, DEC Number 186-1322) Upper Hudson River Basin, Warren County, New York. Phase I Inspection Report,
George Koch. 2 Jun 80, 102p
Contract DACW51-79-C-0001
Availability: Microfiche copies only.

Windover dam consists of 2 earth embankments abutting a 140 feet long concrete capped masonry

spillway, the maximum height of which is 15 feet. The left embankment is 75 feet long and the right embankment is 125 feet long. The crest width is 5 feet. The upstream slope is 1 vertical on 3 horizontal and the downstream slope is 1 and 2. A reservoir drain is located near the left end of the spillway. The examination of documents and the visual inspection of Windover Dam did not reveal conditions which constitute an immediate hazard to human life or property. However, the dam has some deficiencies which require further investigation and remedial action. Using the Corps of Engineers 'screening criteria' for the initial review of spillway adequacy, it has been determined that the embankment would be overtopped for all storms in excess of 37% of the PMF (Probable Maximum Flood). The spillway is, therefore, adjudged as 'seriously inadequate' and the dam is assessed as unsafe, non-emergency.

AD-A090 937/4 MF **A01**
New York State Dept. of Environmental Conservation, Albany.
National Dam Safety Program. Warner Dam, Chautauqua Lake Outlet (Inventory Number NY 750) Allegheny River Basin, Chautauqua County, New York. Phase I Inspection Report,
Bent L. Thomsen, and Gary L. Wood. 30 Sep 80, 163p
Contract DACW51-79-C-0001
Prepared in cooperation with Thomsen Associates, Groton, NY.
Availability: Microfiche copies only.

Examination of available documents and a visual inspection of the dam did not reveal conditions which constitute an immediate hazard to human life or property. However, the dam has some deficiencies which require further investigation and remedial action. Using the Corps of Engineers screening criteria for review of spillway adequacy, it has been determined that the dam would be overtopped for all storms exceeding approximately 75 percent of the PMF. The spillway is, therefore, considered to be 'inadequate'. A review of the structural stability analysis performed by the designer indicated calculated safety factors against sliding to be less than recommended minimum value. A more detailed analysis which was performed as a part of this Phase I investigation produces a similar conclusion. Therefore, it is recommended that within 6 months of notification to the owner a detailed field investigation and monitoring program be undertaken to determine the actual hydrostatic uplift pressures along the base of the dam and that further detailed structural stability analyses be performed using this information. Debris should be removed from the upstream face of the dam as part of the routine maintenance program. Finally, leakage along the south side of the south tainter gate should be monitored on a daily basis with these observations documented in the dam operator's log book.

AD-A090 938/2 MF **A01**
New York State Dept. of Environmental Conservation, Albany.
National Dam Safety Program, Mill Pond Dam (Inventory Number NY 368), Lake Champlain Basin, Essex County, New York. Phase I Inspection Report,
George Koch. 28 Aug 80, 141p
Contract DACW51-79-C-0001
Original contains color plates. All DTIC/NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

Examination of available documents and a visual inspection of the dam did not reveal conditions which constitute an immediate hazard to human life or property. Several deficiencies were noted and these should be corrected within 6 months of the date of final approval of this report. Among the actions which should be taken are refilling the cribs which are missing material, repair of displaced timbers on the downstream face, replace broken timbers, repair of the valve on the drain, and repair of the spalling concrete on the wingwall which extends downstream of the north abutment. In addition, a detailed emergency action plan and warning system should be developed. This dam does not have sufficient spillway capacity to adequately discharge the peak outflow from one-half the PMF. The analysis indicates that the dam would be overtopped by all storms exceeding 15% of the PMF. However, the structural stability analysis indicates that the dam would be stable when subjected to the PMF storm event. Therefore, the spillway is assessed as being inadequate. The water surface level for either the PMF or one-half the PMF would result in flow around the northern end of the concrete wingwall which extends from the abutment of the dam. An accurate topographic survey should be performed where this end around flow is likely to occur.

AD-A090 939/0 MF **A01**
New York State Dept. of Environmental Conservation, Albany.
National Dam Safety Program. Lake Placid Village Dam. (Inventory Number NY 781), Lake Champlain River Basin, Essex County, New York. Phase I Inspection Report,
John B. Stetson. 16 Sep 80, 143p
Contract DACW51-79-C-0001
Prepared in cooperation with Stetson-Dale Engineering Co., Utica, NY. Original contains color plates. All DTIC/NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

The examination of documents and visual inspection of the dam and appurtenant structures did not reveal conditions which constitute an immediate hazard to human life or property. The dam, however, has a number of problem areas which require further investigation and remedial work. The structural stability analysis indicates that the dam is unstable when subjected to forces which could occur under the Probable Maximum Flood (PMF) loading condition. Unsatisfactory stability is indicated for the dam when subject to forces which could occur during the normal winter operations and the 1/2 PMF loading condition. A structural stability investigation should be started within six months to determine the characteristics of the uplift forces acting on the dam and to determine whether the foundation acts integrally with the dam section to resist overturning. Remedial work should be completed, depending on the results of the investigation, within two years. The hydrologic/hydraulic analysis establishes the spillway capacity as 10.7% of the Probable Maximum Flood (PMF). The dam will be overtopped by 10.0 feet and 4.8 feet during the PMF and 1/2 PMF respectively. The spillway is inadequate since failure of the dam during the 1/2 PMF event will not significantly increase the downstream hazard from that which would occur just prior to the dam failure.

AD-A090 940/8 MF **A01**
New York State Dept. of Environmental Conservation, Albany.
National Dam Safety Program. Fredonia Reservoir (Inventory Number NY 749), Lake Erie Basin, Chautauqua County, New York. Phase I Inspection Report.
Bent L. Thomsen, and Gary L. Wood. 20 Sep 80, 158p
Contract DACW51-79-C-0001
Prepared in cooperation with Thomsen Associates, Groton, NY. Original contains color plates. All DTIC/NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

Examination of available documents and a visual inspection of the dam revealed conditions which if not corrected constitute a hazard to human life or property. Using the Corps of Engineers screening criteria for review of spillway adequacy, it has been determined that the dam would be overtopped by all storms exceeding approximately 34 percent of the PMF. The overtopping of the dam could cause erosion in the notched earthen section adjacent and parallel to the concrete Ogee weir resulting in possible undermining and failure of the spillway. Failure of the spillway would result in an increased hazard to the loss of life and property downstream. The spillway is, therefore, judged as 'seriously inadequate' and the dam is assessed as unsafe, non-emergency. The classification of 'unsafe' applied to a dam because of a 'seriously inadequate' spillway is not meant to imply the same degree of emergency as would be associated with an 'unsafe' classification applied for a structural deficiency. It does mean, however, there appears to be a serious deficiency in the spillway capacity and if a severe storm were to occur, overtopping and possible failure of the spillway and dam could take place. Thereby significantly increasing the hazard to loss of life downstream of the dam.

AD-A090 941/6 MF **A01**
New York State Dept. of Environmental Conservation, Albany.
National Dam Safety Program. Lake George Outlet Dam (Inventory Number NY 230), Lake Champlain River Basin, Essex County, New York. Phase I Inspection Report,
John B. Stetson. 28 Aug 80, 156p
Contract DACW51-79-C-0001
Prepared in cooperation with Stetson-Dale Engineering Co., Utica, NY. Original contains color plates. All DTIC/NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

The examination of documents and visual inspection of the dam and appurtenant structures did not reveal conditions which constitute an immediate hazard to human life or property. The dam, however, has a number of problem areas which should be investigated further. The structural stability analysis indicates unsatisfactory stability for the dam when subjected to forces which could occur during winter operations (including ice loading), the Probable Maximum Flood (PMF), and 1/2 PMF events. A structural stability investigation of the dam should be started within 6 months to determine the effect of the dam's steel bar anchor system and the uplift forces acting on the base of the dam. Remedial measures should be completed within 2 years to increase the structural stability of the facility to meet the Corps of Engineers screening criteria. The hydrologic/hydraulic analysis establishes the spillway capacity as 46% of the Probable Maximum Flood (PMF) with the sluice gates open and 30% of the PMF if the gates remain closed throughout the storm. The dam will be overtopped by 2.72 feet by the PMF with the gates closed or 2.55 feet with the gates opened. However, the spillway is capable of passing the 1/2 PMF under either of these two conditions without the dam being overtopped. Therefore, the spillway is assessed as inadequate according to the Corps of Engineers screening criteria.

AD-A090 942/4 PC **A17**/MF **A01**
Little (Arthur D.), Inc., Cambridge, MA.
Mathematical Development of the Spill Assessment Model (SAM) for Hydrazine and Similar Acting Materials in Water Bodies.
Final rept. Feb 79-Feb 80,
Richard G. Potts, John H. Hagopian, Caren R. Woodruff, and Phani P. Raj. Feb 80, 388p
AFESC/ESL-TR-80-07
Contract F08635-79-C-0084

The objective of this work was to develop a mathematical model for application in assessing the impact of catastrophic spills. Specifically, the model addresses instantaneous and continuous point source discharges into water courses including rivers, lakes, and estuaries. The spill model primarily assesses dispersive characteristics of spills of the hydrazine family fuels in the aquatic environment; however, the development of the model has been carried out in a generalized form using parameters and interchangeable data items so as not to restrict the scope of application unnecessarily. Results which can be produced by the model include the pollutant concentration as a function of location, time, and physical, chemical, and biological characteristics of the pollutant. The spill model estimates the extent and duration of hazardous concentrations in water bodies associated with accidental discharges and determines when these concentrations drop below toxic levels. The spill model is designed to become a management tool to support a clean-up operation in the event of a spill, to provide emergency discharge contingency planning, to permit post-incident analyses, and to serve as a basis for further development of methods of hazard assessment. (Author)

AD-A091 004/2 PC **A09**/MF **A01**
Texas Tech Univ Lubbock Water Resources Center
The Trinity River Greenway: A Prototype.
Final rept.,
James D. Mertes, Arthur N. Glick, Robert M. Sweazy, and Terry T. Cheek. Jun 72, 190p Rept no. WRC-72-3

Contract DACW63-72-C-0009
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

The report focuses on the development of a portion of the Trinity River as a potential open space corridor or 'greenway' connecting Fort Worth and Dallas with a lineal, continuous natural areas parkway. The purpose is to determine through an ecological planning process the least environmental impact route for the proposed Trinity multipurpose channel, and the influence on adjacent lands resulting from the alignment, construction and operation of the channel. (Author)

AD-A091 005/9 PC **A05**/MF **A01**
Argonne National Lab., IL. Energy and Environmental Studies Div.
Impact of Aircraft Emissions on Air Quality in the Vicinity of Airports. Volume II. An Updated Model Assessment of Aircraft Generated Air Pollution at LAX, JFK, and ORD.
Final rept. Jan 78-Jul 80,
R. J. Yamartino, D. G. Smith, S. A. Bremer, D. Heinold, and D. Lamich. Jul 80, 89p FAA/EE-80-09B
Contract DOT-FA77WAI-736
See also Volume I, AD-A089 962.

This report documents the results of the Federal Aviation Administration (FAA)/Environmental Protection Agency (EPA) air quality study which has been conducted to assess the impact of aircraft emissions of carbon monoxide (CO), hydrocarbons (HC), and oxides of nitrogen (NOx) in the vicinity of airports. This assessment includes the results of recent modeling and monitoring efforts at Washington National (DCA), Los Angeles International (LAX), Dulles International (IAD), and Lakeland, Florida airports and an updated modeling of aircraft generated pollution at LAX, John F. Kennedy (JFK) and Chicago O'Hare (ORD) airports. The Airport Vicinity Air Pollution (AVAP) model which was designed for use at civil airports was used in this assessment. In addition the results of the application of the military version of the AVAP model the Air Quality Assessment Model (AQAM), are summarized. Both the results of the pollution monitoring analyses in Volume I and the modeling studies in Volume II suggest that: maximum hourly average 60 CO concentrations from aircraft are unlikely to exceed 5 parts per million (ppm) in areas of public exposure and are thus small in comparison to the National Ambient Air Quality Standard of 35 ppm; maximum hourly HC concentrations from aircraft can exceed 0.25 ppm over an area several times the size of the airport; and while annual average NO2 concentrations from aircraft are estimated to contribute only 10 to 20 percent of the NAAQS limit level.

AD-A091 076/0 MF **A01**
New York State Dept. of Environmental Conservation, Albany.
National Dam Safety Program. Ogdensburg Water Power Company Dam Inventory Number (NY400) Oswegatchie River Basin. St. Lawrence County, New York. Phase I Inspection Report,
John B. Stetson. 26 Sep 80, 255p
Contract DACW51-79-C-0001
Prepared in cooperation with Stetson-Dale Engineering Co., Utica, NY.
Availability: Microfiche copies only.

This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization. The examination of documents and visual inspection of the dam and appurtenant structures did not reveal conditions which constitute an immediate hazard to human life or property. The dam, however, has a number of problem areas which require further surveillance and remedial work. The following is a list of recommended measures to be undertaken to insure safety of the facility. These measures should be completed within two years. (1) The existing sluice gate structure has suffered structural damage so as to render the gates inoperable. Repairs should be undertaken to place the sluice gate structure in proper operating condition. (2) Repairs should be undertaken on the deteriorated concrete surfaces of the abutments and spillway. (3) A flood warning and emergency evacuation system should be implemented to alert the public in the event conditions occur which could result in failure of the dam. (4) A formalized inspection system should be initiated to develop data on conditions and maintenance operations at the facility.

AD-A091 088/5 MF **A01**
New York State Dept. of Environmental Conservation, Albany.
National Dam Safety Program. Millbrook Watershed Project Site I (Inventory Number NY 715) Susquehanna River Basin, Chenango County, New York. Phase I Inspection Report,
George Koch. 30 Sep 80, 94p
Contract DACW51-79-C-0001
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization. The examinatin of documents and visual inspection of the Mill Brook Site 1 Dam did not reveal conditions which constitute a hazard to human life or property. The total discharge capacity of the spillways is adequate to impound and safely discharge the floodwaters resulting from the Probable Maximum Flood (PMF).

AD-A091 130/5 MF **A01**
New York State Dept. of Environmental Conservation, Albany.
National Dam Safety Program. Clarks Mills Dam, (Inventory Number NY 120) Upper Hudson River Basin, Washington County, New York. Phase I Inspection Report,
John B. Stetson. 28 Aug 80, 133p
Contract DACW51-79-C-0001
Prepared in cooperation with Stetson-Dale Engineering Co., Utica, NY. Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

The examination of documents and visual inspection of the dam and appurtenant structures did not reveal conditions which constitute an immediate hazard to human life or property. The dam, however, has a number of problem areas which should be investigated, evaluated, and remedied. The following remedial measures should be undertaken within one year: (1) Eliminate leakage into the interior core of the dam and repair deteriorated concrete on the north abutment and at the pier separating the two sections of the dam; (2) A formalized inspection program should be initiated to develop data on conditions and maintenance operations at the facility; and (3) A flood warning and emergency evacuation plan should be developed and implemented to alert the public in the event conditions occur which could result in failure of the dam.

AD-A091 131/3 MF **A01**
New York State Dept. of Environmental Conservation, Albany.
National Dam Safety Program. Clear Lake Dam (Inventory Number NY751), Lake Erie Basin, Erie County, New York. Phase I Inspection Report,
George Koch. 22 May 80, 145p
Contract DACW51-79-C-0001
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspectin of the dam by the performing organization. The examination of documents and visual inspection of Clear Lake Dam and appurtenant structures did not reveal conditions which constitute a hazard to human life or property. The dam, however, has a number of problem areas which require remedial action. The discharge capacity of the spillway is inadequate for all floods in excess of 50% of the Probable Maximum Flood (PMF). During the 1/2 PMF event the water surface will be at the top of the dam and the outflow will be 4254 cfs. The spillway is therefore assessed as inadequate.

AD-A091 132/1 MF **A01**
New York State Dept. of Environmental Conservation, Albany.
National Dam Safety Program. Panama Dam (Inventory Number NY 784) Allegheny River Basin Chautauqua County. Phase I Inspection Report,
George Koch. 22 May 80, 73p
Contract DACW51-79-C-0001
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization. The examination of documents and the visual inspection of Panama Dam did not reveal conditions which constitute an immediate hazard to human life or property. However, the dam has some deficiencies which require additional studies to further evaluate conditions affecting the dam. Using the Corps of Engineers Screening Criteria for the initial review of spillway adequacy, it has been determined that the embankment would be overtopped for all storms in excess of 5% of the PMF (Probable Maximum Flood). This determination has been confirmed by the overtopping of the dam during the September 14, 1979 storm, which resulted in the need for evacuation of Panama Village residents and the closing of NYS Route 474 due to extensive erosion. The spillway is therefore, adjudged as 'seriously inadequate' and the dam is assessed as unsafe, non-emergency. The classification of 'unsafe' applied to a dam because of a 'seriously inadequate' spillway is not meant to connote the same degree of emergency as would be associated with an 'unsafe' classification applied for a structural deficiency.

AD-A091 133/9 MF **A01**
New York State Dept. of Environmental Conservation, Albany.
National Dam Safety Program. Keuka Lake Outlet Dam (Inventory Number NY 390), Oswego River Basin, Yates County, New York. Phase I Inspection Report,
George Koch. 16 Sep 80, 107p
Contract DACW51-79-C-0001
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization. Examination of available documents and a visual inspection of the dam did not reveal conditions which constitute an immediate hazard to human life or property. Several deficiencies were noted and these should be corrected within 6 months of the date of the final approval of this report. Among the other actions which should be taken are repairing concrete on the post supporting the northern slide gate, filling the small scoured areas behind the sheet pile wall and monitoring the leakage through the masonry wall. In addition, a detailed emergency operation-action plan and warnng system should be developed. The spillways do not have sufficient capacity to discharge the peak outflow from one-half the Probable Maximum Flood (PMF). For this storm event and lesser events, high discharges will cause damage in the channel downstream of the dam. However, dam failure would not significantly increase the hazard to loss of lie downstream from that which would exist just prior to an overtopping-induced failure. Therefore, the spillway is assessed as inadequate. (Author)

AD-A091 134/7 MF **A01**
New York State Dept. of Environmental Conservation, Albany.
National Dam Safety Program. Findley Lake Dam (Inventory Number NY 752), Lake Erie Basin, Chautauqua County, New York. Phase I Inspection Report,
Bent L. Thomsen, and Gary L. Wood. 26 Sep 80, 167p
Contract DACW51-79-C-0001
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization. The examination of the available documents and the visual inspection of the Findley Lake Dam did not reveal conditions which constitute an immediate hazard to human life or property. However, this dam has deficiencies which require further investigation and remedial action. Using the Corps of Engineers screening criteria for review of spillway adequacy, it has been determined that the dam would be overtopped for all storms exceeding approximately 20 percent of the PMF. The overtopping of the dam could cause the erosion of the embankment, especially around the outlet conduit, which would result in dam failure, thus significantly increasing the hazard to the loss of life, especially on the New York State highway which traverses its crest. To a lesser degree, there is also a potential loss of life by overtopping or breaching a downstream village street which is the only other connection between 2 halves of the Village. The spillway is, therefore, adjudged as 'seriously inadequate' and the dam is assessed as unsafe, non-emergency.

AD-A091 135/4 MF **A01**
New York State Dept. of Environmental Conservation, Albany.
National Dam Safety Program. Brocton Reservoir (Inventory Number NY 785), Lake Erie Basin, Chautauqua County, New York. Phase I Inspection Report,
Bent L. Thomsen, and Gary L. Wood. 26 Sep 80, 181p
Contract DACW51-79-C-0001
Prepared in cooperation with Thomsen Associates, Groton, NY. Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization. Examination of available documents and a visual inspection of the dam did not reveal conditions which constitute an immediate hazard to human life or property. However, the dam has some deficiencies which require further investigation and remedial action. Using the Corps of Engineers screening criteria for review of spillway adequacy, it has been determined that the dam would be overtopped for all storms exceeding approximately 52 percent of the PMF. The overtopping of the dam could cause the erosion of the west embankment-spillway contact and downstream face of the west embankment resulting in spillway failure, thus increasing the hazard to the loss of life downstream. The spillway is, therefore, considered to be 'inadequate'. Structural stability analysis based on available information and the visual inspection indicates that the stability of the spillway section against overturning is inadequate for the loading conditions of maximum ice load at normal pool as well as one half and full PMF. A wet area, detected during the visual inspection(s) along the toe of the east embankment could, depending on the source of the wet area, affect the stability of the east embankment.

AD-A091 136/2 PC **A12**/MF **A01**
New York State Dept. of Environmental Conservation, Albany.
National Dam Safety Program. Court Street Dam (Inventory Number NY 6843), Monroe County, New York. Phase I Inspection Report,
Bent L. Thomsen, and Gary L. Wood. 30 Sep 80, 251p
Contract DACW51-79-C-0001
Prepared in cooperation with Thomsen Associates, Groton, NY. Original contains color plates: All DTIc and NTIS reproductions will be in black and white.

This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization. The examination of documents and the visual inspection of the Court Street Dam did not reveal conditions which constitute an immediate hazard to human life or property. However, the dam has some deficiencies which require remedial action. Under the conditions of flow exceeding approximately 25 percent of the PMF the capacity of the river channel itself will be exceeded. Therefore, the spillway is judged inadequate but with the understanding that this is not critical in view of the fact that the river channel will not pass the one-half PMF event without overtopping either. Hence, the hazard downstream is not significantly increased. No stability analyses (either overturning or sliding) were deemed appropriate for the Court Street Dam since it is embedded into the underlying bedrock and the gates are below the channel bottom when open. Therefore, there are no sliding or overturning forces acting. The dam has a number of problem areas which, if left uncorrected, have the potential for the development of hazardous conditions and must be corrected within one year.

AD-A091 137/0 MF **A01**
New York State Dept. of Environmental Conservation, Albany.
National Dam Safety Program. Conewango Creek Watershed Project Site 33 (Inventory Number NY 581), Allegheny River Basin, Chautauqua County, New York, Phase I Inspection Report,
Bent L. Thomsen, and Gary L. Wood. 10 Sep 80, 190p
Contract DACW51-79-C-0001
Prepared in cooperation with Thomsen Associates, Groton, NY. Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization. The examination of available engineering documents and visual inspection of the Conewango Creek Watershed Project - Site 33 dam did not disclose conditions which constitute a hazard to downstream human life or property. The total discharge capacity of the combined principal and auxiliary spillways is adequate to impound and safely discharge the floodwater resulting from the Probable Maximum Flood (PMF). A number of minor deficiencies were noted on this structure. These deficiencies include: debris around the trash racks of the orifice in the riser intake structure, debris (logs) on the lower half of the upstream slope as measured from the crest to the normal pool elevation, slight erosion along abutment-embankment contacts on lower third of downstream slope, damaged internal drainage pipes above plunge pool, small animal burrow on downstream slope just above riprap around the principal spillway outlet pipe, wet areas beyond downstream toe in waste area along east side of outlet channel and natural flood plain on the west side of the outlet channel.

AD-A091 138/8 MF **A01**
New York State Dept. of Environmental Conservation, Albany.
National Dam Safety Program. Fredonia Reservoir (Inventory Number NY-749), Lake Erie Basin. Chautauqua County, New York. Phase I Inspection Report,
Bent L. Thomsen, and Gary L. Wood. Sep 80, 161p
Contract DACW51-79-C-0001
Original contains color plates: All DTIC and NTIS reproductions will be in black and white. Prepared in cooperation with Thomsen Associates, Groton, NY.
Availability: Microfiche copies only.

This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization. Examination of available documents and a visual inspection of the dam revealed conditions which if not corrected constitute a hazard to human life or property. Using the Corps of Engineers screening criteria for review of spillway adequacy, it has been determined that the dam would be overtopped by all storms exceeding approximately 34 percent of the PMF. The overtopping of the dam could cause erosion in the notched earthen section adjacent and parallel to the concrete Ogee weir resulting in possible undermining and failure of the spillway. Failure of the spillway would result in an increased hazard to the loss of life and property downstream. The spillway is, therefore, judged as 'seriously inadequate' and the dam is assessed as unsafe, non-emergency.

AD-A091 139/6 PC **A07**/MF **A01**
New York State Dept. of Environmental Conservation, Albany.
National Dam Safety Program. Loon Lake Dam (Inventory Number NY-795), Upper Hudson River Basin, Warren County, New York. Phase I Inspection Report,
John B. Stetson. Jul 80, 136p
Contract DACW51-79-C-0001
Original contains color plates: All DTIC and NTIS reproductions will be in black and white. Prepared in cooperation with Stetson-Dale Engineering Co., Utica, NY.

This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization. The examination of documents and visual inspection of the dam and appurtenant structures did not reveal conditions which constitute an immediate hazard to human life or property. The dam, however, has a number of problem areas which require further investigation and remedial work. The structural stability analysis indicates unsatisfactory stability would result from loadings which could occur during normal winter operations. Marginal stability is indicated during the Probable Maximum Flood (PMF) and 1/2 PMF flows. A structural stability investigation should be commenced within six months to determine the characteristics of the uplift forces acting on the dam, the properties of the existing dam, and the effect of these conditions on the stability of the dam. Remedial work should be undertaken, depending on the results of this investigation and completed within two years.

AD-A091 140/4 MF **A01**
New York State Dept. of Environmental Conservation, Albany.
National Dam Safety Program. Lock 24-Eric Canal (Inventory Number NY-792), Oswego River Basin, Onondaga County, New York. Phase I Inspection Report,
Bent L. Thomsen, and Gary L. Wood. Sep 80, 170p
Contract DACW51-79-C-0001
Original contains color plates: All DTIC and NTIS reproductions will be in black and white. Prepared in cooperation with Thomsen Associates, Groton, NY.
Availability: Microfiche copies only.

This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization. The examination of documents and the visual inspections of the Lock 24 dam did not reveal conditions which constitute an immediate hazard to human life or property. However, the dam has some deficiencies which require further investigation and remedial action. The spillway cannot pass the peak outflow from one-half the PMF. For this storm and lesser storm events, a high tailwater condition resulting in flooding of downstream areas would occur. Therefore, overtopping would not significantly increase the hazard to loss of life downstream from that which would exist just before such overtopping and the spillway is assessed as inadequate.

AD-A091 141/2 MF **A01**
New York State Dept. of Environmental Conservation, Albany.
National Dam Safety Program. Ischua Creek Watershed Project Site 6A (Inventory Number NY-571), Allegheny River Basin, Cattaraugus County, New York. Phase I Inspection Report,
Bent L. Thomsen, and Gary L. Wood. Jul 80, 181p
Contract DACW51-79-C-0001
Original contains color plates: All DTIC and NTIS reproductions will be in black and white. Prepared in cooperation with Thomsen Associates, Groton, NY.
Availability: Microfiche copies only.

This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization. The examination of available engineering documents and visual inspection of the Ischua Creek Watershed Project-Site 6A dam did not disclose conditions which constitute a hazard to downstream human life or property. The total discharge capacity of the combined principal and auxiliary spillways is adequate to impound and safely discharge the floodwater resulting from the Probable Maximum Flood (PMF).

AD-A091 142/0 MF **A01**
New York State Dept. of Environmental Conservation, Albany.
National Dam Safety Program. Smith Mills Reservoir Dam (Inventory Number NY-786), Lake Erie Basin, Chautauqua County, New York. Phase I Inspection Report,
George Koch. Mar 80, 95p
Contract DACW51-79-C-0001
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

The examination of documents and visual inspection of Smith Mills Reservoir Dam and appurtenant structures, did not reveal conditions which constitute an immediate hazard to human life or property. The dam, however, has a number of problem areas which require investigation and remedial action. These areas are as follows: The spillway is inadequate for all storms in excess of 1% of the PMF (Probable Maximum Flood). The spillway capacity for analysis purposes is 110 cfs before overtopping of the dam would occur. The PMF was calculated to be 25,300 cfs. The dam is overtopped by 7.4 feet during the 1.2 PMF and 12.7 feet during the PMF. The ability of the dam to withstand overtopping and the need to provide additional spillway capacity will have to be evaluated. The design and configuration of the dam is such that only a detailed analysis of the structural stability, which is beyond the scope of this report, will provide sufficient information to determine if overtopping of the dam will be detrimental to the stability of the structure. Therefore, a detailed structural stability investigation is required to determine the type and extent of required remedial measures. This analysis should be inititated as soon as possible with remedial action, as a result of this investigation, completed within the following year.

AD-A091 143/8 MF **A01**
New York State Dept. of Environmental Conservation, Albany.
National Dam Safety Program. Lake Jefferson Dam (Inventory Number NY-205), Delaware River Basin, Sullivan County, New York. Phase I Inspection Report,
George Koch. Feb 80, 135p
Contract DACW51-79-C-0001
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

The examination of documents and visual inspection of Lake Jefferson Dam and appurtenant structures did not reveal conditions which constitute a hazard to human life or property. The discharge capacity of the spillway is inadequate for all flows in excess of 50% of the Probable Maximum Flood (PMF). During the 1.2 PMF event the water surface will be 0.1 feet below the top of the dam and the outflow will be 15,200 cfs. The following problem areas were observed which require remedial action within 1 year of notification to the owners: (1) Repair the deteriorated portions of the spillway, spillway walls concrete core wall and capping; (2) Monitor the seepage observed at the toe of the earth embankment at bi-weekly intervals with the aid of weirs; (3) Remove the trees and brush on the slopes and abutments of the dam. Provide a program of periodic cutting and mowing; and (4) Provide a program of periodic inspection and maintenance of the dam and appurtenances, including yearly operation and lubrication of the reservoir drain system, and monitoring of the sedimentation behind the spillway. Document this information for future reference. Also develop an emergency plan. (author)

AD-A091 147/9 PC **A04**/MF **A01**
Gannett, Fleming, Corddry and Carpenter, Inc., Harrisburg, PA.
National Dam Inspection Program. Hawk Mountain Dam (NDI ID Number PA-01129, DER ID Number 54-180), Susquehanna River Basin, Lower Little Swatara, Schuylkill County, Pennsylvania. Phase I Inspection Report.
Jul 80, 75p
Contract DACW31-80-C-0017
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. The purpose of a Phase I investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general conditions of the dam is based upon available data and visual inspections.

AD-A091 148/7 PC **A06**/MF **A01**
Gannett, Fleming, Corddry and Carpenter, Inc., Harrisburg, PA.
National Dam Inspection Program. Locklin Pond Dam (NDI ID Number PA-00139, DER ID Number 64-31), Delaware River Basin, Lakeville Creek, Wayne County, Pennsylvania. Phase I Inspection Report.
Jul 80, 101p
Contract DACW31-80-C-0017
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

Based on available records, visual inspection, calculations, and past operational performance, Locklin Pond Dam is judged to be in good condition. Based on the size and hazard classification of the dam, the recommended SDF at the dam varies between the 100-year flood and the 1.2 PMF. Based on the criteria, the selected SDF is the 1.2 PMF. Based on existing conditions, the spillway will pass about 8 percent of the PMF before overtopping of the dam occurs. No stability problems are evident at the dam. There are no emergency drawdown facilities at the dam. Maintenance at the dam needs to be improved.

AD-A091 149/5 MF **A01**
Gannett, Fleming, Corddry and Carpenter, Inc., Harrisburg, PA.
National Dam Inspection Program. Lower Klondike Dam (NDI ID Number PA-00751, DER ID Number 64-175), Delaware River Basin, Lehigh River, Wayne and Lackawanna Counties, Pennsylvania. Phase I Inspection Report.
Jul 80, 91p
Contract DACW31-80-C-0017
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

Based on available records, visual inspection, calculations, and past operational performance, Lower Klondike Dam is judged to be unsafe, nonemergency, because conditions exist that are potentially hazardous to the stability of Lower Klondike Dam. The conditions include the following: a slide on the downstream slope; a depression on the downstream slope; steep downstream slopes over some reaches of the dam; concentrated seepage at various locations; growth of trees on the dam; deterioration of the spillway chute with heavy drain hole discharge and possible undermining of the concrete slabs; a crack with differential movement in the left wall of the chute; and both deformation of and accumulations of soil in the outlet conduit. Recommendations are provided for remedial measures.

AD-A091 150/3 MF **A01**
GAI Consultants, Inc., Monroeville, PA.
National Dam Inspection Program. Wadham Creek Dam (NDI-PA-00547, PennDer-40-209), Susquehanna River Basin, Wadham Creek, Luzerne County, Pennsylvania. Phase I Inspection Report.
Aug 80, 100p
Contract DACW31-80-C-0016
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

Based on a visual inspection, operational history, and available engineering data, the dam is considered to be in fair condition. The size classification of the facility is small and its hazard classification is considered to be high. In accordance with the recommended guidelines, the Spillway Design Flood (SDF) for the facility ranges between the 1/2-PMF (Probable Maximum Flood) and the PMF. Due to the high potential for damage to downstream structures and possible loss of life that could be associated with a sudden breach of the embankment, the SDF is considered to be the PMF. Results of hydrologic and hydraulic analysis indicate the spillway for Wadham Creek Dam is capable of passing and/or storing the PMF. Consequently, the spillway is considered adequate.

AD-A091 162/8 MF **A01**
GAI Consultants, Inc., Monroeville, PA.
National Dam Inspection Program. Steel Dam (NDI I.D. Number PA-00495, PENNDER I.D. Number 63-63), Ohio River Basin, Center Branch of Pigeon Creek, Washington County, Pennsylvania.
Aug 80, 81p
Contract DACW31-80-C-0016
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

The visual inspection, operational history and hydrologic/hydraulic analysis indicate that the facility is in good condition. The size classification of the facility is small and its hazard classification is considered to be high. In accordance with the recommended guidelines, the Spillway Design Flood (SDF) of the facility ranges between the 1/2-PMF (Probable Maximum Flood) and the PMF. Due to the high potential for damage to downstream structures and possible loss of life, the SDF is considered to be the PMF. Results of the hydrologic and hydraulic analysis indicate the facility will pass and/or store approximately 51% of the PMF prior to embankment overtopping at the low top of dam. Thus, the spillway system is considered to be inadequate, but not seriously inadequate. Should the embankment crest be regraded to design elevation, the spillway would be capable of passing approximately 60% of the PMF prior to embankment overtopping.

AD-A091 163/6 MF **A01**
Woodward-Clyde Consultants, Plymouth Meeting, PA.
National Dam Inspection Program. Hilltown Dam (NDS ID Number PA-01065, DER ID Number 9-177, SCS PA-625), Delaware River Basin, Bucks County, Pennsylvania. Phase I Inspection Report.
Aug 80, 110p
Contract DACW31-80-C-0018
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

Hilltown Dam is owned by the Neshaminy Water Resources Authority and maintained by Bucks County. The dam and reservoir are used as a flood control structure for the downstream town of Chalfont, Pennsylvania. The impoundment was designed by the United States Department of Agriculture, Soil Conservation Service, in 1977, and the structure was officially completed in 1980. The dam and its appurtenant facilities are considered to be in good condition. The dam is classified as an 'Intermediate' size structure with a 'High' hazard classification, consistent with its potential in the event of failure for extensive property damage and loss of life downstream of the dam and in Chalfont, Pennsylvania.

AD-A091 164/4 MF **A01**
D'Appolonia Consulting Engineers, Inc., Pittsburgh, PA.
National Dam Inspection Program. Spruce Reservoir Dam (NDI I.D. PA-487, DER I.D. 60-7) Susquehanna River Basin, Spruce Run, Union County, Pennsylvania. Phase I Inspection Report.
1980, 71p
Contract DACW31-80-C-0022
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

Based on the evaluation of the existing conditions, the condition of Spruce Reservoir is considered to

be fair. In view of indications of surficial slumps on the downstream face of the main embankment, combined with the observations that the embankment does not have any internal drainage system to control seepage through the embankment and the downstream slope is relatively steep (2H:1V), concern exists as to the actual location of the phreatic surface through the embankment and its effect on the stability of the dam. Based on these observations, reevaluation of the stability of the embankment is recommended. According to the recommended criteria, intermediate size dams in the high hazard category are required to pass full probable maximum flood (PMF) without overtopping the embankment. The flood discharge capacity was evaluated according to the recommended criteria and the bypass channel spillway was found to pass 60% of the PMF without overtopping the embankment on the upstream side of Spruce Reservoir. For 80% of the PMF, it was found that flow entering the reservoir over the upstream embankment can pass through the reservoir overflow spillway without overtopping the main embankment.

AD-A091 165/1 PC **A05**/MF **A01**
Baker (Michael), Jr., Inc., Beaver, PA.
National Dam Safety Program. Ethel Springs Dam (NDI Number PA 01121, PennDER Number 65-13), Ohio River Basin, Westmoreland County, Pennsylvania. Phase I Inspection Report.
Aug 80, 92p
Contract DACW31-80-C-0025
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

Ethel Springs Dam is owned and operated by the Borough of Derry Municipal Water Authority. The dam is classified as a 'High' hazard - 'Intermediate' size dam. The dam was found to be in poor overall condition at the time of inspection. Hydraulic/hydrologic evaluations, performed in accordance with procedures established by the Baltimore District, Corps of Engineers, for Phase I Inspection Reports, revealed that the spillway will pass approximately 40 percent of the Probable Maximum Flood (PMF) before overtopping will occur. A spillway design flood (SDF) equal to the PMF is required for Ethel Springs Dam. Additional analyses were performed to assess whether or not the dam would fail under 1/2 Probable Maximum Flood (1/2 PMF) conditions. Since the duration and depth of overtopping under the 1/2 PMF (6.0 hours and 0.28 feet, respectively) do not exceed the limiting criteria assumed for failure of the dam (8.0 hours and 1 foot), it has been estimated that failure of the dam under 1/2 PMF conditions is not likely. The spillway is therefore considered 'inadequate' but not 'seriously inadequate.' The owner should immediately initiate an engineering study to further evaluate the spillway capacity and to develop recommendations for remedial measures to reduce the overtopping potential of the dam. The possibility of movement of the upstream slope and the uncertainties of construction of the dike and downstream slope are causes for concern for the continued stability and safety of this dam. It is recommended that a detailed overall investigation of this dam be performed.

AD-A091 166/9 PC **A05**/MF **A01**
Woodward-Clyde Consultants, Plymouth Meeting, PA.
National Dam Inspection Program. Warrington Township Retention Basin (NDS I.D. Number PA 01066, DER I.D. Number 9-176), Delaware River Basin, Bucks County, Pennsylvania. Phase I Inspection Report.
Aug 80, 79p
Contract DACW31-80-C-0018
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

Warrington Township Retention Basin Dam was built to control storm runoff resulting from upstream residential development. Visual inspection and review of design and construction documentation indicate that the dam and appurtenant structures of Warrington Township Retention Basin Dam are in generally good condition. In accordance with criteria established by Federal (OCE) Guidelines, the spillway design flood for this 'Small' size dam and 'Significant hazard classification is the 100 Year Flood to one-half the Probable Maximum Flood (PMF). Because of the dam's low height and small total capacity, the selected spillway design flood is the 100 year event. Hydrologic and hydraulic computations presented in Appendix D indicate that the spillways are capable of passing the 100 year event without overtopping the embankment under design conditions. Under existing conditions, the spillway capacity is estimated to be overtopped by about 0.2 feet. The spillway system of this structure is considered to be 'inadequate' under assumed existing conditions.

AD-A091 171/9 PC **A07**/MF **A01**
Air Force Engineering and Services Center, Tyndall AFB, FL. Engineering and Services Lab.
Analysis for the Accuracy Definition of the Air Quality Assessment Model (AQAM) at Williams Air Force Base, Arizona. Volume I. Technical Discussion.
Final rept. Jul 76-Mar 80,
R. J. Yamartino, L. A. Conley, D. M. Rote, F. J. Lamich, and E. P. Dunphy. Mar 80, 140p Rept no. AFESC/ESL-TR-80-19-VOL-1

The Air Quality Assessment Model (AQAM) overall predictive accuracy is analyzed using actual air base ambient air quality measurements. These measurements of CO, NO, NO(x), THC, CH4, and visibility at Williams Air Force Base, Arizona, from June 1976 to June 1977 were compared with AQAM predicted air pollution concentrations to determine AQAM's predictive power. The AQAM accuracy is analyzed on an hour-by-hour basis and statistical bases using accumulative frequency distribution. The conclusions are that AQAM accuracy is well within the accuracy range expected for Gaussian urban dispersion models. Even though an attempt was made to select an isolated base from urban background emissions, the background concentration had to be accounted for in the analysis. Concentrations in the air base vicinity were extremely low when compared with background concentrations resulting from urban transport. Without the background concentration adjustments, the AQAM model tended to underpredict the pollutant concentrations. The results also indicate that AQAM is especially accurate in simulating the potential worst case airbase concentrations associated with morning hours, low wind speeds, stable atmospheric conditions, and high activity. (Author)

AD-A091 207/1 MF **A01**
New York State Dept. of Environmental Conservation, Albany.
National Dam Safety Program. Toronto Reservoir Dam. (Inventory Number NY 506), Delaware River Basin, Sullivan County, New York. Phase I Inspection Report,
George Koch. 15 Aug 80, 92p
Contract DACW51-79-C-0001
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization. The examination of documents and visual inspection of Toronto Reservoir Dam and appurtenant structures did not reveal conditions which constitute an immediate hazard to human life or property. The dam, however, has a number of problem areas which require investigation and remedial action.

AD-A091 222/0 PC **A04**/MF **A01**
D'Appolonia Consulting Engineers, Inc., Pittsburgh, PA.
National Dam Inspection Program. Doverspike Number 1 Dam (NDI ID PA-01131, DER ID 33-56). Ohio River Basin, Cherry Run, Jefferson County, Pennsylvania. Phase I Inspection Report,
Lawrence D. Andersen. 27 Aug 80, 63p
Contract DACW31-80-C-0022
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

Based on the evaluation of the existing conditions, the condition of Doverspike No. 1 Dam is considered to be poor due to the inadequate size of the emergency spillway discharge channel. Field observations indicate that the capacity of the discharge channel is significantly less than the capacity of the emergency spillway overflow section, and a major portion of the flow passing the control section would spill onto the embankment, posing a potential for erosion of the embankment. The condition of the embankment is considered to be good. According to the recommended criteria, intermediate size dams in the high hazard category are required to pass full probable maximum flood (PMF) without overtopping the embankment. The flood discharge capacity was evaluated according to the recommended criteria and was found to pass about 30 percent of the PMF without overtopping the embankment. Therefore, the spillway capacity is rated to be inadequate. Because overtopping of the embankment during the passage of 50 percent of the PMF for a duration of 3.2 hours with a maximum depth of 0.4 foot is not considered to present a serious breach potential, the spillway is not considered to be seriously inadequate.

AD-A091 223/8 PC **A04**/MF **A01**
Kimball (L. Robert) and Associates, Ebensburg, PA.
National Dam Inspection Program. Lake Renee Dam (NDS ID Number PA-732, DER ID Number 52-172). Marcel Lake Estates. Delaware River Basin, Dingman's Creek, Pike County, Pennsylvania. Phase I Inspection Report.
Sep 80, 72p
Contract DACW31-80-C-0020
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

The inspection and review of data for Lake Renee Dam did not reveal any problems which require emergency action. However, a low area beyond the right abutment which provides additional discharge capacity, should be provided with erosion protection. The dam otherwise appears to be in fair condition. Lake Renee Dam is a high hazard-small size dam. The spillway design flood (SDF) for a dam of this size and classification is 1/2 PMF to the PMF. The PMF has been selected as the SDF based on the downstream potential for loss of life. The spillway and reservoir are capable of controlling 42% of the PMF, however additional discharge capacity exists beyond the right abutment and is capable of passing an additional 58% of the PMF. Survey stakes in this area noted during the July 30th inspection indicated a possibility of fill material being placed, therefore, possibility reducing the flow through this area in the future. Therefore, the dam is capable of passing the entire SDF. Based on criteria established by the Corps of Engineers, the spillway is termed as adequate.

AD-A091 224/6 PC **A05**/MF **A01**
Kimball (L. Robert) and Associates, Ebensburg, PA.
National Dam Inspection Program. Tobyhanna Number 2 Dam (NDS ID Number PA-779, DER ID Number 45-36). Delaware River Basin, Tobyhanna Creek, Monroe County, Pennsylvania. Phase I Inspection Report.
Sep 80, 78p
Contract DACW31-80-C-0020
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

The assessment of Tobyhanna Lake No. 2 Dam is based upon visual observations made at the time of inspection, review of available records and data, hydraulic and hydrologic computations and past operational performance. The inspection and review of data of Tobyhanna Lake No. 2 Dam did not reveal any problems which would require emergency action. The dam and spillway appear to be in good condition and are adequately maintained. Tobyhanna Lake No. 2 Dam is a high hazard-intermediate size dam. The spillway design flood (SDF) for a dam of this size and classification is the PMF. The spillway and reservoir are capable of controlling approximately 58% of the PMF. Based on criteria established by the Corps of Engineers, the spillway is termed inadequate.

AD-A091 225/3 PC **A04**/MF **A01**
Kimball (L. Robert) and Associates, Ebensburg, PA.

National Dam Inspection Program. Lake Pinecrest Dam (NDS ID Number PA-641, DER ID Number 40-200). Lake Pinecrest Sportmans Club. Susquehanna River Basin, Tributary to Huntington Creek, Luzerne County, Pennsylvania. Phase I Inspection Report.
Sep 80, 65p
Contract DACW31-80-C-0020
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

The assessment of Lake Pinecrest Dam is based upon visual observations made at the time of inspection, review of available records and data, hydraulic and hydrologic computations and past operational performance. In general, Lake Pinecrest Dam appears to be in fair condition. No seepage was noted on the downstream slope or along the toe of the dam. Several wet areas were observed along the downstream toe of the dam. The spillway is in a deteriorating condition. Several cracks were observed in the spillway walls. Discharges from the spillway are eroding the outlet of the structure. Lake Pinecrest Dam is a high hazard-small size dam. The spillway design flood for a dam of this size and classification is in the range of 1/2 PMF to PMF. The spillway design flood for this dam was selected as the PMF based on the downstream potential for loss of life and property damage. The spillway and reservoir are capable of controlling approximately 66% of the PMF without overtopping the earthen embankment. Based on criteria established by the corps of Engineers, the spillway is termed inadequate.

AD-A091 237/8 PC **A04**/MF **A01**
Army Engineer Waterways Experiment Station, Vicksburg, MS. Hydraulics Lab.
Spillway for Cooper Dam, Sulphur River, Texas. Hydraulic Model Investigation.
Final rept. May 78-Apr 79,
John F. George. Aug 80, 69p Rept no. WES/TR/HL-80-15

Tests were conducted on a 1:36-scale model for Cooper Lake Spillway to investigate the hydraulic performance of the structure for various flow conditions. The model reproduced approximately a 1,300-ft-long approach area, the entire service spillway including nonoverflow sections, and 800 ft of exit channel. Approach conditions immediately upstream of the spillway created a buildup of the water surface along the left and right sides of the spillway. MOdifications to the approach wing walls eliminated the buildup of the water surface, but did not significantly improve the velocity distribution or flow conditions throughout the structure. The modified wing walls were considerably more expensive to construct; therefore, the original wing wall design was reinstalled. (Author)

AD-A091 256/8 MF **A01**
Ackenheil and Associates, Inc., Pittsburgh, PA.
National Dam Safety Program. Treated Water Pond (NDI Number PA 01138, PennDER Number 63-91), Ohio River Basin, Sawmill Creek, Washington County, Pennsylvania. Phase I Inspection Report.
Sep 80, 105p
Contract DACW31-80-C-0026
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

The general condition of the Treated Water Pond is considered to be fair. This assessment is based primarily on visual observations of embankment conditions and lack of information on the structural capacity of conduits through the embankment. The structure is classified as an 'intermediate' size, 'high' hazard dam. Corps of Engineers guidelines recommend the Probable Maximum Flood (PMF) as the Spillway Design Flood for an 'intermediate' size, 'high' hazard dam. The Treated Water Pond's Spillway Design Flood is the Probable Maximum Flood. Spillway capacity is 'adequate' because the non-overtopping flood discharge was found, by using the HEC-1 computer program, to be in excess of 100 percent of the PMF. The visual inspection indicates several minor deficiencies in addition to those requiring further investigation. The deficiencies can be corrected or improved through implementation of the following recommended evaluation, remedial, monitoring and/or maintenance efforts.

AD-A091 257/6 MF **A01**
Ackenheil and Associates, Inc., Pittsburgh, PA.
National Dam Inspection Program. Refuse Settling Basin (NDI Number PA 00908, PennDER Number 63-78), Ohio River Basin, Sawmill Creek, Washington County, Pennsylvania. Phase I Inspection Report.
Sep 80, 103p
Contract DACW31-80-C-0026
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

The general condition of the Refuse Settling Basin is considered to be fair. This assessment is based on visual observations that indicate a possible inadequate margin of safety against slope failure of a high ground water level exists in Embankment A. The condition is not considered to represent an immediate threat to the structure because of the relatively low impoundment pool elevation. It should, however, be evaluated. If a high ground water does not exist in Embankment A, the facility can be considered to be in good condition. The structure is classified as an 'intermediate' size, 'high' hazard dam. Corps of Engineers guidelines recommend the Probable Maximum Flood (PMF) as the Spillway Design Flood for an 'intermediate' size, 'high' hazard dam. The visual inspection indicated several minor deficiencies in addition to the possible high ground water condition. The deficiencies can be corrected or improved through implementation of the following recommended evaluation, remedial, monitoring and/or maintenance efforts.

AD-A091 258/4 MF **A01**
Ackenheil and Associates, Inc., Baltimore, MD.
National Dam Inspection Program. Piney Run Dam (NDI-ID Number MD139), Chesapeake Bay Basin, Piney Run, Carroll County, Maryland. Phase I Inspection Report,
James D. Hainley, and Timothy E. Debes. Aug 80, 101p
Contract DACW31-80-C-0026
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

Piney Run Dam was constructed as a zoned earthfill structure. The dam embankment consists of an impervious clay core extending from dam foundation to crest, and upstream and downstream embankment shells. Piney Run Dam has a maximum toe to crest height of 73 ft., a crest width of 22 ft., and is 624 ft. long. Upstream and downstream embankments slope 3H:1V. Hydraulic discharge facilities include a principal spillway riser, reservoir drain, water supply intake and outlet structure, and an emergency spillway channel. Based on the evaluation of available design information and visual observations of conditions as they existed on the dates of the field reconnaissances, the general condition of Piney Run Dam is considered to be good. Review of available design information indicates the emergency spillway can pass the PMF without overtopping the dam crest. Therefore, spillway discharge capacity is assessed adequate and in accordance with recommended guideline criteria.

AD-A091 259/2 MF **A01**
Rummel, Klepper and Kahl, Baltimore, MD.
National Dam Inspection Program. Edgewater Village (NDI-ID Number MD-83), Bush River Basin, Unnamed Tributary of Otter Point Creek, Harford County, Phase I Inspection Report,
Edward J. Zeigler. Jul 80, 66p
Contract DACW31-80-C-0050
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

Edgewater Village Dam, constructed in 1971, is a zoned earth fill embankment with an impervious core. The embankment is approximately 29.5' high at its maximum section and is approximately 800 feet long. The dam was constructed at the same location as an earlier dam which impounded the unnamed tributary of Otter Point Creek. The flood discharge facilities for the dam consist of an overflow structure and a manually operated sluice gate located in the intake chamber of the overflow structure. Based on the visual inspection, available records, past operational performance, and in accordance with the guideline criteria established for these studies, Edgewater Village Dam is judged to be in fair condition. According to the hydrologic and hydraulic analyses, the Edgewater Village Dam will pass 100 percent of the Probable Maximum Flood without overtopping and its spillway is rated adequate.

AD-A091 260/0 MF **A01**
Rummel, Klepper and Kahl, Baltimore, MD.
National Dam Inspection Program. Peck's Branch Dam (NDI-ID Number MD-23) Patapsco River Basin, Gwynns Run, Baltimore City, Maryland. Phase I Inspection Report,
Edward J. Zeigler. Jul 80, 64p
Contract DACW31-80-C-0050
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

Peck's Branch Dam is the impoundment for wash water discharged from the Ashburton Water Purification Plant. The perimeter of the impoundment is approximately 2050 feet as measured along the fence surrounding the wash water lake. Of the 2050 feet, approximately 1500 feet is an embankment extending above the original ground line. The embankment is approximately 55 feet high at its maximum section along the southern side of the impoundment. The southern and southeastern embankments of the dam were constructed over an existing rock fill embankment. Overflow from the lake is controlled by the drop inlet spillway at the southern end of the lake which discharges into a 9.75' x 10' semi-elliptical drain. The drain discharges directly into Gwynns Run. Based on the visual inspection, available records, past operational performance, and in accordance with the guidelines criteria established for these studies, Peck's Branch Dam is judged to be in poor condition. Except for rainfall on the wash water lake surface and a small amount of surface water runoff from the northern end of the lake, the only inflow into the lake is from the water purification plant, and therefore, flood routing analyses are not required.

AD-A091 261/8 MF **A01**
Rummel, Klepper and Kahl, Baltimore, MD.
National Dam Inspection Program. Lake Linganore (NDI-ID Number MD-21) Potomac River Basin, Linganore Creek, Frederick County, Maryland. Phase I Inspection Report,
Edward J. Zeigler. Jul 80, 92p
Contract DACW31-80-C-0050
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

The Lake Linganore Dam consists of an earth embankment approximately 750 feet long and 62.5 feet high at is maximum section. The crest of the dam has a minimum crest width of 12 feet. The flood discharge facilities for the dam include a 48-inch diameter diversion pipe and sluice gate vault, and a 122 foot wide ogee crest spillway. According to the hydrologic and hydraulic analyses, Lake Linganore Dam will overtop by 0.6 foot for a duration of 4 hours during a flood equalling 50% of the Probable Maximum Flood (PMF). The analyses indicate that the Lake Linganore Dam spillway can pass approximately 48% of the PMF without overtopping the dam.

AD-A091 262/6 MF **A01**
Rummel, Klepper and Kahl, Baltimore, MD.
National Dam Inspection Program. St. Mary's River Watershed, Site Number 1, (NDI-ID Number MD-28) Potomac River Basin, Western Branch of St. Mary's River, St. Mary's County, Maryland. Phase I Inspection Report,
Edward J. Zeigler. Jul 80, 76p
Contract DACW31-80-C-0050
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

St. Mary's River Watershed, Site No. 1, completed in 1975, is a zoned earth fill embankment with an impervious core, a cutoff trench, and a toe drain. The embankment is 38 feet high at its maximum section and is approximately 1670 feet long. The flood discharge facilities for the dam consist of the principal spillway comprised of a drop inlet spillway and two manually operated sluice gates located in the spillway riser structure, and a 300 foot wide

emergency spillway located adjacent to the right abutment of the dam. According to the hydrologic and hydraulic analyses, the St. Mary's River Watershed, Site No. 1 dam will pass 100 percent of the Probable Maximum Flood without overtopping, and therefore its spillway is rated adequate.

AD-A091 263/4 PC **A05**/MF **A01**
Ackenheil and Associates, Inc., Pittsburgh, PA.
National Dam Inspection Program. Lakewood Dam. (NDI Number PA-00909, PennDER Number 3-76), Ohio River Basin, Hottenbaugh Run, Lawrence County, Pennsylvania. Phase I Inspection Report,
Samuel G. Mazzella, James P. Hannan, and James E. Barrick. Sep 80, 90p
Contract DACW31-80-C-0026
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

Lakewood Dam's embankment consists of three earthfill sections that have a total crest length of 295 feet (excluding spillways). The right embankment section, which comprises the major portion of the dam, is 6 ffet high, 155 feet long, and has a crest width of eight feet. The upstream slope is 4.4H:1V and the downstream slope is 1H:1V. The central embankment section is 45 feet long and lies between the principal and emergency spillways. It has a maximum height of 16.4 feet and crest width of about six feet. The left embankment section is an earthfill dike constructed on the left abutment. The dike is 95 feet long, has a crest width of 8 feet and a maximum height of 16.4 feet. The general condition of Lakewood Dam is considered to be poor. This assessment is based primarily on visual observations of badly deteriorated spillway structures and an 'inadequate' spillway capacity.

AD-A091 264/2 PC **A04**/MF **A01**
Ackenheil and Associates, Inc., Baltimore, MD.
National Dam Inspection Program. University of Maryland Baltimore County Dam (NDI-ID Number MD34), Chesapeake Bay Basin, West Branch of Herbert Run, Baltimore County, Phase I Inspection Report,
James D. Hainley, and Timothy E. Debes. Aug 80, 69p
Contract DACW31-80-C-0026
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

The UMBC Dam was constructed as a zoned earthfill structure. The dam is approximately 255 ft. long, with a maximum toe to crest height of 41 ft. and a crest width of 20 ft. The principal spillway consists of a reinforced concrete entrance structure, a 259 ft. long 72 in. dia. reinforced concrete outlet pipe and a reinforced concrete impact stilling basin. The emergency spillway channel is excavated into natural earth is located at the left abutment. The spillway channel is approximately 150 ft. wide with a 30 ft. long level control section at the dam centerline. Review of available hydrologic/hydraulic design calculations indicate the emergency spillway can pass the PMF without overtopping the dam embankment. Therefore, spillway capacity is assessed as adequate, in accordance with recommended guideline criteria.

AD-A091 265/9 PC **A05**/MF **A01**
Kimball (L. Robert) and Associates, Ebensburg, PA.
National Dam Inspection Program. Lake Catalpa Dam (NDS-ID Number PA-560), (DER-ID Number 40-57) Susquehanna River Basin, Falls Creek, Luzerne County, Pennsylvania. Phase I Inspection Report,
R. Jeffrey Kimball. Sep 80, 77p
Contract DACW31-80-C-0020
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

Lake Catalpa Dam is an earthen embankment with dry masonry walls on both the upstream and downstream sides. Portions of the downstream slope have been replaced with concrete walls. The maximum height is 23 feet. The crest width ranges from 27.5 feet to 30 feet, the crest length is 160 feet. A paved road passes over the crest of the dam. Parapet walls are present both upstream and downstream above the roadway elevation. The reservoir drain is operated by a sluice gate located in the valve house and consists of a 30 in. pipe of unknown material. The spillway is a three sided weir structure placed against the upstream wall with a total crest length of 26 feet. The weir crest is formed by an ogee crest with fish screens along the entire length. The ogee slopes to the entrance of a tunnel through the dam. The tunnel is 6 feet wide and 8.1 feet to 12.7 feet high. The tunnel discharges into an open rectangular shaped channel, at the downstream end of the structure. This rectangular channel continues for about 20 feet where it discharges into a tributary of Leonard Creek. The spillway and reservoir are capable of controlling approximately 33% of the PMF. Based on criteria established by the Corps of Engineers, the spillway is termed inadequate.

AD-A091 266/7 PC **A06**/MF **A01**
Kimball (L. Robert) and Associates, Ebensburg, PA.
National Dam Inspection Program. Lake of the Four Seasons Dam (NDS-ID Number PA-568, DER-ID Number 40-225) Susquehanna River Basin, Oley Creek, Luzerne County, Pennsylvania. Phase I Inspection Report,
R. Jeffrey Kimball. Sep 80, 103p
Contract DACW31-80-C-0020
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

The Lake of the Four Seasons Dam consists of two earthfill impounding structures. The main embankment (dam) is an earthfill dam, 1500 feet long and 29 feet high. At the left abutment of the main embankment (dam) are two spillways. One spillway consists of a concrete culvert type spillway, modified to function as an orifice. Immediately adjacent to the concrete structure at the left abutment is an open earth cut channel which serves as a temporary auxiliary spillway for the dam. The second impounding structure (dike) is located approximately 1/2 mile southwest of the main embankment. The dike is approximately 600 feet long, and 26 feet high. A permanent concrete ogee spillway is located approximately 500 feet southwest of the dike on the left abutment. The spillway and reservoir are capable of controlling approximately 54% of the PMF. Definitions used by the Corps of Engineers indicate that the spillway should be rated as inadequate. However, the temporary and permanent (as designed) auxiliary spillway has the potential for erosion of the exit channel and subsequent erosion of the toe of dam. It is possible that a failure of the dam could result at less than 1/2 PMF by erosion of the embankment toe.

AD-A091 267/1 PC **A04**/MF **A01**
Rummel, Klepper and Kahl, Baltimore, MD.
National Dam Inspection Program. Druid Hill Lake (NDI-ID Number MD-109) Patapsco River Basin, Jones Falls, Baltimore City, Maryland. Phase I Inspection Report,
Edward J. Zeigler. Jul 80, 59p
Contract DACW31-80-C-0050
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

Druid Hill Lake is impounded by an earthfill dam consisting of a northern, eastern, and southern embankment. The lake is a reservoir for filtered water which is pumped from the Montebello Water Purification Plant. The dam, completed in 1871, was recognized by the American Society of Civil Engineers in 1971 as a National Historical Civil Engineering Landmark. The water level of the reservoir is maintained at approximately elevation 212. The maximum pool level of elevation 216 represents the top elevation of the overflow pipe located at the eastern end of the reservoir. Water normally leaves the reservoir by gravity flow through an outlet header at the eastern end of the lake. Because all inflow into the reservoir is controlled, with the exception of rainfall directly on the lake and a small amount of surface runoff, flood routing and detailed hydraulic and hydrologic analyses are not required.

AD-A091 268/3 PC **A05**/MF **A01**
Rummel, Klepper and Kahl, Baltimore, MD.
National Dam Inspection Program. Johnson's Pond (NDI-ID Number MD-11), Wicomico River Basin, Wicomico River, Wicomico County, Maryland. Phase I Inspection Report,
Edward J. Zeigler. Jul 80, 93p
Contract DACW31-80-C-0050
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

The dam consists of a concrete and steel ogee spillway, wingwalls, and a clay fill embankment constructed on either side of the spillway. Including the lengths of clay fill embankments shown on the contract drawings of the dam, the total length of the dam is 580+ feet. the Concrete and steel structure is comprised of a 300 foot long ogee spillway with wingwalls at the left and right abutments. According to the dam crest survey, the lowest point along the clay fill is elevation 14.5 and is located adjacent to the right wingwall. The crest elevation of the ogee spillway is +11.1, and a 30 foot long notch with a crest elevation of 10.6 is located in the middle of the spillway. Three sluice gates are located in the spillway directly below the notch. According to the hydrologic and hydraulic analyses, the Johnson's Pond embankment will overtop by 0.4 foot for a duration of 10 hours during a flood equaling 50 percent of the Probable Maximum Flood (PMF). The analyses indicate that the Johnson's Pond spillway can pass approximately 43% of the PMF before overtopping commences.

AD-A091 269/1 PC **A05**/MF **A01**
Rummel, Klepper and Kahl, Baltimore, MD.
National Dam Inspection Program. Columbia LNG (NDI-ID Number MD-116), Chesapeake Bay, Wilbur Creek, Calvert County, Maryland. Phase I Inspection Report,
Edward J. Zeigler. Jul 80, 86p
Contract DACW31-80-C-0050
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

The main and secondary dams of the Columbia LNG spoil embankments are earth fill dams constructed with compacted random fill. Each dam has a chimney drain and a slurry trench cutoff wall. The main dam is 74 feet high at its maximum section and is approximately 670 feet long. The main dam was constructed across Wilbur Creek. The secondary dam is 34 feet high at its maximum section and is approximately 230 feet long. Inflow into the main impoundment is either from surface runoff from the drainage area or from precipitation falling directly on the lake. The flood discharge facility for the main dam consists of the principal spillway which is a drop inlet; the flood discharge facility for the secondary dam also consists of a drop inlet spillway. According to the hydrologic and hydraulic analyses, both the main and secondary dams will pass 100 percent of the Probable Maximum Flood without overtopping, and therefore the spillway of each dam is considered adequate.

AD-A091 274/1 MF **A01**
New York State Dept. of Environmental Conservation, Albany.
National Dam Safety Program. Helderberg Lake Dam (Inventory Number NY276), Lower Hudson River Basin, Albany County, New York. Phase I Inspection Report,
George Koch. 15 Aug 80, 86p
Contract DACW51-79-C-0001
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

Helderberg Lake Dam consists of a 285 foot long earth embankment with concrete cutoff wall and a 55 foot wide concrete channel spillway. The maximum height above the original stream bed is approximately 35 feet. Both the upstream and downstream slopes of the earth embankment are 1 vertical to 2 horizontal, and the crest width is 12 feet. The dam was reconstructed in 1944 after a failure of the original structure in 1938. The spillway crest was increased in length from 35 feet to 55 feet and lowered 2 feet. The original cutoff wall which is founded on bedrock was lengthened and increased in height by 2.25 feet. A 20 in. drain pipe was installed and incorporated into the tunnel that was in the original dam. The examination of documents and visual inspection of Helderberg Lake Dam and appurtenant structures did not reveal conditions which constitute a hazard to human life or property. The discharge capacity of the spillway is inadequate for all storms in excess of 50% of the PMF (Probable Maximum Flood).

AD-A091 275/8 MF **A01**
New York State Dept. of Environmental Conservation, Albany.
National Dam Safety Program. Fresh Air Fund Dam Number 2 (Inventory Number NY726), Hudson River Basin, Dutchess County, New York. Phase I Inspection Report,
Eugene O'Brien. 12 Sep 80, 84p
Contract DACW51-79-C-0001
Prepared in cooperation with Tippetts-Abbett-McCarthy-Stratton, New York. Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

Fresh Air Fund Dam No. 2 is an earth embankment approximately 1100 feet long, with a maximum height of about 47 feet and a crest width of 17 feet. The grassed downstream slope varies from approximately IV:2.5H to 1V:3.0H. A 36-inch diameter reinforced concrete pipe located near the left abutment serves as the principal spillway for the dam. An excavated auxiliary spillway channel is located at the right abutment. A 12-inch diameter corrugated steel reservoir drain is located at the approximate center of the dam. Discharge is controlled by a manually operated center rising screw-type valve, which is supported by a concrete platform approximately 10 feet from the upstream crest edge. Examination of available documents and visual inspection of the Fresh Air Fund Dam No. 2 and appurtenant structures did not reveal conditions which constitute a hazard to human life or property. Using the Corps of Engineers screening criteria for review of spillway adequacy, it has been determined that the dam would not be overtopped under full PMF conditions. The PMF routed through the reservoir required only 41 percent of the spillway outflow capacity. The spillway capacity is therefore adjudged as adequate.

AD-A091 276/6 MF **A01**
Schnabel Engineering Associates, Richmond, VA.
National Dam Safety Program. Lower Beaver Pond Dam (Inventory Number VA04106), James River Basin, Chesterfield County, Virginia. Phase I Inspection Report.
Final rept.,
Ray E. Martin, and James A. Walsh. Sep 80, 64p
Contract DACW69-79-D-0004
Prepared in cooperation with J. K. Timmons and Associates, Inc.
Availability: Microfiche copies only.

Lower Beaver Pond Dam is a zoned earthfill structure approximately 400 ft long and 23 ft high at the low point on the dam. The crest of the dam is 40 ft wide, and side slopes are approximately 3 horizontal to 1 vertical (3:1) on the upstream slope and 2.5 horizontal to 1 vertical (2.5:1) on the downstream slope. The principal spillway consists of a 25 ft x 10 ft reinforced concrete overflow weir box. A 24 inch diameter sluice gate in the weir box is used to lower the pool level. The spillway will pass 15 percent of the Probable Maximum Flood (PMF) or 150 percent of the SDF. The spillway is rated adequate.

AD-A091 277/4 MF **A01**
Ackenheil and Associates, Inc., Pittsburgh, PA.
National Dam Inspection Program. Raw Water Pond (NDI Number PA-01137, PennDER Number 61-90) Ohio River Basin, Sawmill Creek, Washington County, Pennsylvania. Phase I Inspection Report,
Samuel G. Mazzella, James P. Hannan, and James E. Barrick. Sep 80, 82p
Contract DACW31-80-C-0026
Original contains color plates: All DTIC and NTiS reproductions will be in black and white.
Availability: Microfiche copies only.

The Raw Water Pond was designed and constructed as an earthfill structure with clay core and cutoff along the centerline. The embankment is 1190 feet long, with a toe to crest height of 25.2 feet and a crest width of 25 feet. The Raw Water Pond outlet works is a 14 inch diameter steel pipe with an intake at the bottom of the Pond. The outlet works maintains the operating pool approximately 1.5 feet below the invert of the principal (and emergency) spillway. A gate valve and flow monitoring weir box are located downstream of the embankment. Outlet works flows are discharged to the Treated Water Pond below. Based on a review of available design information and visual observations of conditions as they existed on the date of the field inspection, the general condition of the Raw Water Pond is considered to be poor. This assessment is based primarily on visual observations that indicate a possible inadequate margin of safety against slope failure of the embankment. Spillway capacity is 'inadequate' because the non-overtopping flood discharge was found, by using the HEC-1 computer program, to be in 0.18 PMF.

AD-A091 278/2 MF **A01**
New York State Dept. of Environmental Conservation, Albany.
National Dam Safety Program. Fresh Air Fund Dam, Site 1 (Deer Lake) (Inventory Number NY288), Lower Hudson River Basin, Dutchess County, New York. Phase I Inspection Report,
George Koch. 30 Sep 80, 178p
Contract DACW51-79-C-0001
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

The Fresh Air Fund Dam consists of a 880 feet long homogeneous earth embankment with rip rap protection on the upstream slope. It is about 44 feet in height at its maximum, with a crest width of 20 feet. The structure has an upstream slope of 3 to 1 and a downstream slope of 2 1/2 to 1. A 4' x 4' concrete drop inlet spillway is located on the left end of the embankment. It empties into a 36 in. diameter corrugated metal pipe running through the embankment and into the original stream channel. A 12 in. steel reservoir drain pipe is located through the embankment at elevation 698. The right end of the embankment is adjacent to the grass lined emergency spillway which is 80 feet wide. The examination of documents and visual inspection of the Fresh Air Fund Dam No. 1 and appurtenant structures did not reveal conditions which constitute a hazard to human life or property. The dam, however, has a number of problem areas which require remedial action. The discharge capacity of the spillway is inadequate for all flows in excess of 85% of the PMF (Probable Maximum Flood). The spillway is therefore, assessed as inadequate.

AD-A091 279/0 MF **A01**
New York State Dept. of Environmental Conservation, Albany.
National Dam Safety Program. Lake Welch Dam (Inventory Number NY283), Hudson River Basin, Rockland County, New York. Phase I Inspection Report,
Eugene O'Brien. 12 Sep 80, 200p
Contract DACW51-79-C-0001
Prepared in cooperation with Tippetts-Abbett-McCarthy-Stratton, New York. Original contains color plates: All DTIC and NTIS reproductions will be in black and white. Includes envelopes with charts.
Availability: Microfiche copies only.

Lake Welch Dam, formerly known as Beaver Pond Dam is located on the east side of Lake Welch. The maximum height of dam is 32 feet. The dam is 788 feet long and consists of a concrete gravity section (563 feet) and an earth embankment (right of gravity section) with a central concrete core wall (225 feet). The concrete dam, supported on a rock foundation consists of 18 monoliths which are anchored to the rock by 25-ton post-tensioned rock anchors. Examination of the available documents and visual inspection of the Lake Welch Dam did not reveal conditions which constitute a hazard to human life or property. Using the Corps of Engineers screening criteria for review of spillway adequacy, it has been determined that concrete gravity section of the dam would be overtopped for all storms exceeding approximately 12 percent of the Probable Maximum Flood (PMF).

AD-A091 280/8 MF **A01**
Baker (Michael), Jr., Inc., Beaver, PA.
National Dam Safety Program. Upper and Lower Dams (NDI Number PA 00389, PennDER Number 20-55, SCS Numbers PA 487A and B), Ohio River Basin, Crooked Creek, Crawford County, Pennsylvania. Phase I Inspection Report.
Aug 80, 132p
Contract DACW31-80-C-0025
Original contains color plates: All DTIC/NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

Upper and Lower Dams consist of two dams in series designed by the U.S. Department of Agriculture, Soil Conservation Service (SCS) for floodwater detention and waterfowl habitat enhancement. Lower Dam is the primary structure upon which this report focuses because the majority of Upper Dam becomes inundated by backwater from Lower Dam before the emergency spillways at Lower Dam are activated. Hydraulic/hydrologic evaluations revealed that the spillways will pass the Probable Maximum Flood (PMF) without overtopping Lower Dam. A spillway design flood (SDF) equal to the PMF is required for Lower Dam. Therefore, the spillways are considered 'adequate.' The inspection revealed only one deficiency which should be corrected immediately, namely, the repair of the chipped concrete on the impact basin of Upper Dam.

AD-A091 347/5 PC **A02**/MF **A01**
Coastal Engineering Research Center, Fort Belvoir, VA.
Surging in the Shark River Boat Basin,
J. Richard Weggel, and Robert M. Sorensen. 1980, 23p Rept no. CERC-REPRINT-80-2
Pub. in Proceedings of the Specialty Conference on Ports '80, ASCE/May 19-20 1980/Norfolk, VA p640-660 1980.

No abstract available.

ANL/CEN/FE-79-14 PC **A05**/MF **A01**
Argonne National Lab., IL.
Support Studies in Fluidized-Bed Combustion. Annual Report, October 1978-September 1979.
I. Johnson, K. M. Myles, and W. M. Swift. 1979, 85p
Contract W-31-109-ENG-38

This work supports the development studies for atmospheric and pressurized fluidized-bed coal combustion. Laboratory and process development studies are aimed at providing needed information on limestone utilization, removal of particulates and alkali metal compounds from the flue gas, control of SO sub 2 and trace pollutant emissions, the mechanism of attrition in fluidized-beds, a method of determining the attrition resistance of sorbents, and other aspects of fluidized-bed coal combustion. (ERA citation 05:037081)

ANL/EES-TM-90(V.3) PC **A15**/MF **A01**
Argonne National Lab., IL.
In Pursuit of Clean Air: A Data Book of Problems and Strategies at the State Level. Volume 3: Federal Regions IV and VI.
D. B. Garvey, and D. G. Streets. Feb 80, 338p
Contract W-31-109-ENG-38

This is the third volume of a five-volume report, designed to provide useful information for policy analysis in the Department of Energy, especially for the examination of possible areas of conflict between the implementation of a national energy policy calling for the increased use of coal and the pursuit of clean air. Information is presented for each state in Federal Regions IV and VI under the following section headings: state title page (includes a summary of air quality data); revised state implementation plan outline; maps of nonattainment areas, as designated; Storage and Retrieval of Aerometric Data (SAROAD); SAROAD data maps; power plant data; power plant maps; and county maps. States in Federal Region IV include: Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, and Tennessee. Those in Federal Region VI include: Arkansas, Louisiana, New Mexico, Oklahoma, and Texas. (ERA citation 05:035384)

ANL/EES-TM-90(V.4) PC **A13**/MF **A01**
Argonne National Lab., IL.
In Pursuit of Clean Air: A Data Book of Problems and Strategies at the State Level. Volume 4. Federal Regions V and VII.
D. B. Garvey, and D. G. Streets. Feb 80, 280p
Contract W-31-109-ENG-38

The following material is provided for each state in Federal Regions V and VII: state title page lists nonattainment areas for each pollutant, the number of monitors with valid readings for a particular averaging time for a pollutant, and the number

of monitors that recorded a violation of the standard); revised State Implementation Plan (SIP) outline (covers sources of the problems, the proposed strategies for achieving attainment, and new state review procedures); maps of nonattainment areas, as designated; SAROAD (Storage and Retrieval of Aerometric Data) data; SAROAD data maps; power plant data; power plant maps; and county maps. States in Federal Region V are Illinois, Indiana, Michigan, Minnesota, Ohio, and Wisconsin. Federal Region VII includes Iowa, Kansas, Missouri, and Nebraska. (ERA citation 05:035385)

ANL/EES-TM-90(V.5) PC **A12**/MF **A01**
Argonne National Lab., IL.
In Pursuit of Clean Air: A Data Book of Problems and Strategies at the State Level. Volume 5. Federal Regions VIII, IX, and X.
D. B. Garvey, and D. G. Streets. Feb 80, 269p
Contract W-31-109-ENG-38

The following material is provided for each state in Federal Regions VIII, IX, and X: state title page (lists nonattainment areas for each pollutant, the number of monitors with valid readings for a particular averaging time for a pollutant, and the number of monitors that recorded a violation of the standard); revised State Implementation Plan (SIP) outline (covers sources of the problems, the proposed strategies for achieving attainment, and new state review procedures); maps of nonattainment areas, as designated; SAROAD (Storage and Retrieval of Aerometric Data) data; SAROAD data maps; power plant data; power plant maps; and county maps. States in Federal Region VIII are Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming. Federal Region IX includes Arizona, California, and Nevada. Federal Region X includes Idaho, Oregon, and Washington. (ERA citation 05:035386)

BNL-51041 PC **A08**/MF **A01**
Brookhaven National Lab., Upton, NY.
Use of County Level Data in Health, Energy, Demographic, Environmental, and Economic Analysis.
S. C. Morris, K. M. Novak, and C. E. Calef. Apr 79, 160p CONF-7703137-
Contract AC02-76CH00016
Computer based conference, Upton, NY, USA, 4 Mar 1977.

This document is an edited record of the conversation, dialogues, and topical discussions of the participants of a computer conference sponsored by the Biomedical and Environmental Assessment Division of Brookhaven National Laboratory during the period March 4-28, 1977. The main objective of the conference was to bring together a number of individual specialists from a wide and diverse range of both academic and professional disciplines to address the usage of county level data in health, energy, demographic, environmental, and economic analysis. A secondary aim of the conference was to test the feasibility and viability of using a computer conference as a means of accomplishing our primary objective. A preface, a list of participants, and the transcript of the main conference and subsession proceedings are included. Also included are information provided by participants on the identification of intercensal county equivalent areas and additional reports and documents relevant to the conference topic. The overall aims and objectives of the conference were successfully accomplished; some of the problems encountered using the computer as a conference vehicle were noted; recommendations were made to continue both formal and informal lines of communication on the subject of county level data. (ERA citation 05:035025)

BNL-51110 PC **A05**/MF **A01**
Brookhaven National Lab., Upton, NY.
Energy-Environmental Impacts of Five Energy Conservation Measures in the Middle Atlantic and Pacific States.
P. D. Moskowitz, E. Edelson, T. Q. Le, W. A. Sevian, and J. E. Smith. Oct 79, 76p
Contract AC02-76CH00016

Estimates of some energy and environmental impacts for five different energy-conservation measures (district heating, industrial cogeneration, retrofit, rate reform, and vehicle redesign) were prepared for two different regions (Middle Atlantic and Pacific) and two different time periods (1985 and 2000) based upon data presented in regional reference energy systems developed at BNL. Results of the analysis indicate that regional energy use can be reduced by <1 to 6%. Vehicle redesign produces the greatest oil savings. Retrofit and district heating can each reduce oil and natural gas use. Industrial cogeneration can significantly reduce use of fuels consumed in central-station electricity production (e.g., coal and nuclear) but at an energy penalty incurred by industry: increased dependence on oil and natural gas could result. Rate reform and retrofit each reduce emissions production in rough proportion to the quantities of energy saved. Vehicle redesign reduces only supply sector emissions; end-use emissions are not affected even though gasoline use significantly decreases. District heating may reduce regional emissions but increase local emission burdens where waste heat is being produced. Local air quality need not be adversely affected, although long-range-transport potential increases. The district-heating concept may also have important effects on future power-plant siting options. Depending on the mix of fuels consumed, industrial cogeneration could increase regional emissions production because of the potential substitution of dirty fuels (coal, industrial wastes, and oil) for clean fuels (natural gas and nuclear); this may be particularly important in the Pacific region. In general, per unit reductions in electrical demand appear to produce greater environmental benefits than equivalent reductions in fuels used directly in an end-use device. (ERA citation 05:036738)

BNL-51223 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Regenerative Process for Desulfurization of High Temperature Combustion and Fuel Gases. Progress Report No. 14, October 1-December 31, 1979.
A. S. Albanese, and D. S. Sethi. Mar 80, 24p
Contract AC02-76CH00016

The characteristics of Portland Type III cement (PC III) as a potential sorbent for use in a regenerative process for desulfurization of coal in fluidized-bed combustion were examined. The sulfation rates for PC III + 5% amorphous SiO sub 2 at temperatures between 860 and 1100 exp 0 C and at 1 atm were studied thermogravimetrically, using a simulated combustion gas mixture containing 0.25% SO sub 2 . The sulfation rates were found to be independent of temperature between 950 and 1050 exp 0 C. The isothermal regeneration with a mixture consisting of 5% CO, 15% CO sub 2 and the balance N sub 2 , in this 100 exp 0 C temperature interval approached an equilibrium value of over 90% within thirty minutes. Sulfation/regeneration efficiency did not decrease with cycling and was unaffected by additives introduced to increase the porosity and/or conversion of free CaO in PC III to silicates which are known to be more regenerative than CaSO sub 4 . Pressurized TGA experiments within the optimum sulfation temperature range were conducted at 5 and 10 atm to establish the viability of this sorbent for pressurized fluidized-bed combustion use. Within the experimental accuracy, no pressure dependence of sulfation rate was observed. Our experiments indicate that the attrition resistance of PC III is significantly better than natural limestones. (ERA citation 05:035908)

BNL-51235 PC **A03**/MF **A01**
Brookhaven National Lab., Upton, NY.
Regenerative Process for Desulfurization of High Temperature Combustion and Fuel Gases. Progress Report No. 15, January 1-March 31, 1980.
A. S. Albanese, and D. S. Sethi. Apr 80, 26p
Contract AC02-76CH00016

A new regenerative sorbent process for desulfurizing fluidized-bed combustion gases is presented. The sorbent was developed by Brookhaven National Laboratory and is prepared from commercial silicate bearing portland cement. The chemical reactions and mechanical procedures involved in preparing the sorbent, in desulfurizing the flue gas, in regenerating the spent sorbent, and in producing elemental sulfur from the regenerator product gas are discussed. The performance of natural limestone sorbents is compared with that of portland cement pellets in each of the above operations. Conceptual engineering designs and cost data for atmospheric fluidized-bed (AFB) power generation plants using limestone and portland cement sorbents are also presented. Cost and limestone process data were obtained from US Government publication PRS-23 EPA-600/7-77-126 which was prepared by General Electric, Bechtel and Foster Wheeler Energy Corporations and the Tennessee Valley Authority. The results of our analyses indicate that the cost of generating electricity by a regenerative portland cement sorbent plant would be about 12% lower than for once-through limestone AFB plants, about 17% lower than conventional power plants using wet limestone scrubbers and about 12% lower than regenerative magnesium oxide (MgO) scrubber plants. (ERA citation 05:035864)

BNL-51238 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Emissions of CO sub 2 to the Atmosphere Due to U.S.A. Fossil Fuel Consumption.
V. D. Dang, and M. Steinberg. Jun 80, 18p
Contract AC02-76CH00016

Analysis and projection of carbon dioxide emitted to the atmosphere are estimated based on the Brookhaven reference energy system. Some new results are given on carbon dioxide contribution to the atmosphere from US fossil fuel consumption by different sectors including residential, commercial, industrial and transportation. The total weight of carbon as carbon dioxide emitted to the atmosphere and the additional CO sub 2 concentration over background by different subsectors in the years 1977, 1980, 1985, 1990, 2000 and 2020 are presented. (ERA citation 05:037145)

CONF-800957-1 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Interpreting the Factors Related to Groundwater Impact Assessment of Coal Conversion Solid Wastes.
R. H. Ketelle, and E. K. Triegel. 1980, 15p
Contract W-7405-ENG-26
Annual Madison conference of applied research and practice on municipal and industrial waste, Madison, WI, USA, 10 Sep 1980.

Oak Ridge National Laboratory is currently involved in the assessment of environmental impacts of five proposed coal conversion demonstration facilities. One of the primary areas of concern in demonstrating the environmental acceptability of the technology is the issue of solid waste disposal. Such concern is related to both regulatory compliance and the prevention of groundwater and surface water contamination. This paper presents an overview of the actual information available for the various projects and the techniques used to interpret the data. Analysis of the potential impacts and design of mitigating measures is based in large part on the information developed during this initial period of assessment and data collection. The methods used in the analyses are discussed in terms of the geology and hydrology of one of the sites, the alterations of the baseline monitoring plans imposed by geologic constraints and the feasibility of using certain techniques such as computer modeling. (ERA citation 05:035869)

COO-2911-5 PC **A07**/MF **A01**
General Electric Co., Philadelphia, PA. Space Div.
Development and Demonstration of Stirling/Rankine Heat Activated Heat Pump.
1979, 136p
Contract AC02-77CS20043

In January 1975, General Electric embarked with the American Gas Association (AGA) on a multiphase program for the development of a Gas Heat Pump (GHP). The Department of Energy (DOE) joined General Electric and the AGA in the program in 1976, and the Gas Research Institute assumed responsibility for the program from the AGA in 1977. Phase I of the program was completed in December 1975, and Phase II was initiated in February 1976. The objective of the Phase II program is to demonstrate that the performance estimates generated during Phase I can be realized and that cost goals are realistic. Program effort during the seventh 6-month period of Phase II was concentrated on completion of the Proto 2 detail design, parts fabrication and procurement and the initiation of component tests. In addition, test facilities

were modified and upgraded and field test criteria and site selection activities were initiated. The major accomplishments during the January to June 1979 reporting period are summarized. Detailed descriptions of the program progress on each subsystem and the system design are presented. (ERA citation 05:036811)

DOE/BC/00050-15 PC **A10**/MF **A01**
Spears and Associates, Inc., Tulsa, OK.
Environmental Regulations Handbook for Enhanced Oil Recovery. Final Report.
T. D. Wilson. Aug 80, 210p
Contract AC19-78ET12383

A guide to environmental laws and regulations which have special significance for enhanced oil recovery (EOR) is presented. The Clean Air Act, the Clean Water Act, the Safe Drinking Water Act, Resource Conservation and Recovery Act, federal regulations, and state regulations are discussed. This handbook has been designed as a planning tool and a convenient reference source. The 16 states included comprise the major oil-producing states in various regions of the state. The major topics covered are: general guidelines for complying with environmental laws and regulations; air pollution control; water pollution control; protecting drinking water: underground injection control; hazardous waste management; and federal laws affecting siting or operation of EOR facilities. (ERA citation 05:034561)

DOE/EIS-0068 PC **A17**/MF **A01**
Department of Energy, Washington, DC.
Draft Programmatic Environmental Impact Statement: Development Policy Options, Naval Oil Shale Reserves, Garfield County, Colorado.
Sep 80, 385p

This programmatic statement deals with several levels of potential decisions which can lead to DOE action to develop the oil shale resources of its 35,000-acre Naval Oil Shale Reserves in Northwest Colorado. These decisions may become imminent due to the need to meet the President's 1990 domestic goal of 4.5 million additional barrels of liquid fuels produced or conserved. This is a candidate site for a contingency oil shale development venture. This means that under current DOE policy the Reserve is likely to be opened to development only if there are significant delays and shortfalls in private industry's effort to launch commercial-scale facilities in the area. It compares the environmental impacts from the range of potential production from this Reserve (50 to 200 thousand barrels per day) with impacts from additional development of other liquid fuel options which might have to provide an equivalent amount of shale oil by 1990. These options include coal liquefaction, biomass, and increased conservation. Second, this EIS presents an environmental and financial impact analysis relating five generalized development ventures ranging from a low to a high level of government funding and participation. Developing the Naval Oil Shale Reserves in Colorado to commercial-scale production of 50,000 barrels per day is estimated to have the following gross impacts: alteration of 3% of the total Reserve land; annual consumption of 4624 to 17,500 acre feet of water, depending on process chosen; yearly emissions of 361 tons of SO sub 2 , 3641 tons of NO/sub x/, 656 tons of CO, 951 tons of particulate, 262 tons of HC; and increasing the area population by a total of 7500 people. A specific project EIS, which would discuss environmental impacts in detail, would precede any development action by DOE. (ERA citation 05:036012)

DOE/ET/10533-10 PC **A02**/MF **A01**
West Virginia Univ., Morgantown. Coal Research Bureau.
Utilization of Coal Associated Minerals. Quarterly Report No. 10, January 1-March 31, 1980.
J. F. Slonaker, W. H. Buttermore, J. A. Carlisle, D. L. Durham, and R. B. Muter. 15 Jul 80, 15p
Contract AS01-77ET10533

In the preceding quarterly report, it was reported that while sampling the Solvent Refined Coal II (SRC II) pilot plant at Fort Lewis, Washington, the plant went down and vacuum bottoms waste material representing the minerals flow at the last steady state condition were obtained. This plant has been sampled again and samples of the incoming feed coal, sized coal and vacuum bottoms waste material were obtained. As part of our effort to trace the same mineral suite through mining, preparation and conversion, new samples of feed coal, cleaned coal and refuse were obtained from the District 4 commercial preparation plant. This preparation plant supplies coal to the SRC II pilot plant at Fort Lewis, Washington. A study of the thermal insulating properties of fired flyash based structural materials was completed and is included. (ERA citation 05:036853)

EPRI-EA-1498(V.2) PC **A11**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Plume Conversion Rates in the SURE Region. Final Report.
R. C. Easter, K. M. Busness, J. M. Hales, R. N. Lee, and D. A. Arbuthnot. Aug 80, 246p
Contract AC06-76RL01830

Results of a study of transformation and transport processes in plumes emitted from fossil-fueled power plants are described. Primary research emphasis was placed upon transformations of sulfur and nitrogen oxides, with the principal objective of generating parameterized transformation relationships suitable for input to models currently being developed for the EPRI Sulfate Regional Experiment Program. Extensive field measurements were performed in late spring and late fall of 1977 at two coal-fired and one oil-fired power plants; the Breed plant in Indiana, the Cobb plant in Michigan, and the Andrus plant in Mississippi. Plume measurements were obtained using an instrumented DC-3 aircraft and included gas concentrations (SO sub 2 , NO/sub x/, O sub 3 , NH sub 3 , HNO sub 3 , hydrocarbons), aerosol composition (SO sub 4 / sup =/, NO sub 3- , NH sub 4+), and physical aerosol parameters. Source emission measurements were also performed and SF sub 6 tracer released into the plumes. The resulting data, which include 140 hours of aircraft measurements, have been organized into a data base. Conversion and loss rates of SO sub 2 and NO/sub x/ were estimated using a varity of ratio techniques, and the results were analyzed using reactive plume models of varying complexity. A parameter-search technique was developed to utilize a reactive plume model to establish candidate conversion expressions for SO sub 2 transformations. SO sub 2 was generally found to oxidize in power plant plumes at rates ranging from 0 to 3% hr, depending upon insolation, plume dispersion, and ambient hydrocarbon concentration, as well as possible additional factors. Homogeneous oxidation paths appeared more significant than heterogeneous paths under the conditions observed. Nitrogen oxides data suffer from lower measurement sensitivity, but preliminary indications are that nitrate and nitric acid production proceeds quite slowly in plumes, although substantial total NO/sub x/ losses were sometimes observed. (ERA citation 05:037147)

FE-2346-78 PC **A08**/MF **A01**
Environmental Research Inst. of Michigan, Ann Arbor.
Environmental Monitoring and Analysis in Support of Antrim Oil Shale Research. Final Report, March 1977-July 1980.
G. S. Thomas, and F. J. Tanis. Jul 80, 152p
Contract AC01-76ET12153

Environmental monitoring was conducted to document impacts from an in situ Antrim oil shale experiment. Monitoring took place over a nearly three and one-half year period. Parameters monitored included air quality, water quality (surface and subsurface), site vegetation, surface disruptions, soils, noise, surface elevation and impacts to neighboring residents. Three interim reports were generated which contain a great deal of the baseline data for the environmental monitoring program. They have the same title as this final report and have report numbers FE-2346-28, FE-2346-46, and FE-2346-56. No significant environmental impacts were observed other than physical disruption of the land surface. The presence of chloride in the site pond due to previous operations was noted. (ERA citation 05:036013)

GAT-T-2975 PC **A02**/MF **A01**
Goodyear Atomic Corp., Piketon, OH.
Survey of Asbestos Fibers in Cooling Tower Waters at Goodyear Atomic Corporation.
D. L. Riepenhoff, and D. E. Boyd. 1 Nov 79, 14p
Contract AC05-76OR00001

Monitoring of the recirculating water (RCW) system at Goodyear Atomic Corporation has been performed since late 1975, when detectable amounts of asbestos were found in the RCW. From August 1976 through may 1979, fiber counts varied from below detectable limits (0.7 x 10 exp 6 fibers/liter) to 16.2 x 10 exp 6 fibers/liter in the cooling tower water. These results were nearly identical to the initial asbestos fiber data obtained for RCW from December 1975 through July 1976. From January 1977 through May 1979, water samples from the X-616 Chromate Recovery Facility effluent and the X-611 Water Treatment Plant (RCW makeup) were also analyzed for asbestos, and fiber counts varied from below detectable limits to 0.7 x 10 exp 6 fibers; liter and 1.4 x 10 exp 6 fibers/liter, respectively. The number of fibers in the RCW system and at the X-611 and X-616 facilities does not present an environmental problem at this time. Beginning in June 1978, all samples collected were prepared for analysis by two methods after a United States Environmental Protection Agency-sponsored study demonstrated that a method different from the one used at Goodyear Atomic Corporation had essentially zero fiber losses. To date, no significant differences have been observed between the two methods. In the future, monitoring of asbestos fibers should continue on a periodic basis to determine if an asbestos fiber problem develops.Both methods of sample preparation should be utilized to firmly establish which method is best. (ERA citation 05:036150)

KY-705 PC **A04**/MF **A01**
Paducah Gaseous Diffusion Plant, KY.
Fixed Bed Trapping for Gaseous Fluoride Effluent Control.
M. G. Otey, and C. K. Bayne. 14 Jun 80, 52p
Contract W-7405-ENG-26

To comply with future air quality standards for gaseous fluoride emissions at the PGDP, studies are being made to evaluate the most feasible and efficient method of trapping fluorides from the effluents of the different processes. Although this work is in direct support of environmental projects, its results are applicable in other areas. Throughout the diffusion plants there are several areas where fluorides, either single or multiple species, are controlled and/or processed. The solid sorbent studies represent new, promising technology which could have significant impact on the gaseous diffusion plants. Scoping studies of solid sorbents and reaction conditions have been conducted. In a series of statistically designed experiments, the effects of total gas flow, temperature, and fluoride gas flow were studied for eight dry chemicals in a 1-in. diameter fixed bed designed to remove three separate fluoride gas species (hydrogen fluoride (HF), fluorine (F sub 2), and chlorine trifluoride (ClF sub 3)) from an air stream. The trapping materials selected for the test include two brands of four different material types: soda lime, oolitic calcium carbonate (CaCO sub 3), calcium oxide (CaO), and activated alumina (Al sub 2 O sub 3). Additionally, loading factors and material utilization were determined to allow an economic comparison to be made between bed materials. (ERA citation 05:034611)

LA-UR-80-2604 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Validation and Sensitivity of a Simulated Photograph Technique for Visibility Modeling.
M. Williams, L. Y. Chan, and R. Lewis. 1980, 11p
CONF-801114-3
Contract W-7405-ENG-36
Symposium on plumes and visibility, Grand Canyon, AZ, USA, 10 Nov 1980.

The Los Alamos Scientific Laboratory (LASL) visibility model is capable of producing simulated before and after pictures that illustrate visual effects of smoke plumes. Although the model has been under development for a few years, until recently there had been very little testing of the model against field experience or testing of sensitivity of the model results to numerical approximations used in the model. Further validation and sensitivity testing of the LASL model began in late 1979. The work focused on three areas: comparison of the LASL model results with plumes encountered in the field, comparison of LASL back-

ground-atmosphere model results with measured sky intensities, and examination of the variation of model results with changes in the numerical approximations. The field study took place during August of 1979 in the vicinity of coal-fired power plants in northwestern New Mexico and northern Arizona. Telephotometer, NO/sub X/ plume measurements, and aerosol size distribution measurements were made in the plumes of three different coal-fired power plants. Photographs were taken of the plumes, and simulated photographs were prepared by the model. Light intensities calculated by the background radiative transfer model were compared to measured light intensities in a very clean atmosphere and in a moderately hazy atmosphere. The measured intensities were derived from photographic densities. In addition to the field measurements, differences resulting from increased numbers of wavelengths in the color representation were examined. Other changes were also examined in the numerical approximations. The results of these studies are described. (ERA citation 05:037148)

LA-8504-PR PC **A03**/MF **A01**
Los Alamos Scientific Lab., NM.
Water Supply at Los Alamos During 1979. Progress Report.
W. D. Purtymun. Aug 80, 46p
Contract W-7405-ENG-36

The municipal and industrial water supply for Los Alamos for 1979 consisted of 1407 x 10 exp 6 gal from wells in three fields and 44 x 10 exp 6 gal from the gallery in Water Canyon. Another 0.2 x 10 exp 6 gal of water were pumped to waste during the testing of Well LA-6. About 3.7 x 10 exp 6 gal of water from Guaje Reservoir and 1.3 x 10 exp 6 gal of water from Los Alamos Reservoir were used for irrigation; thus, the total use was about 1456 x 10 exp 6 gal. Water level trends in the wells were as anticipated under current production practices. Well and distribution system rehabilitation should be continued. The rehabilitation of older wells and drilling and development of new wells are necessary to ensure an adequate and reliable water supply for municipal and industrial use at Los Alamos. (ERA citation 05:037172)

ORNL/EIS-169 PC **A15**/MF **A01**
Oak Ridge National Lab., TN.
Environmental Compliance Program Handbook: Illinois.
J. Huffstetler, B. N. Collier, A. D'Amico, C. Gross, and N. McAfee. Sep 80, 330p
Contract W-7405-ENG-26

The US Department of Energy (DOE) has provided funding for a study of a coal conversion demonstration facility that may be located in the State of Illinois. This handbook identifies those Illinois environmental laws, administrative rules and regulations, and permitting procedures that could affect the siting, construction, or operation of such a facility. Areas of primary concern include air quaity, water quality, solid waste disposal, and hazardous waste disposal. All entries are part of a computerized data base built and maintained for DOE at Oak Ridge National Laboratory. (ERA citation 05:035881)

ORNL/EIS-170 PC **A14**/MF **A01**
Oak Ridge National Lab., TN.
Environmental Compliance Program Handbook: Kentucky.
J. Huffstetler, B. N. Collier, A. D'Amico, C. Gross, and N. McAfee. Sep 80, 304p
Contract W-7405-ENG-26

The US Department of Energy (DOE) has provided funding for studies of two coal conversion demonstration facilities that may be located in the Commonwealth of Kentucky. In addition, a large pilot plant funded by DOE has been constructed in Kentucky and is scheduled to commence operation in spring 1980. This handbook identifies those Kentucky environmental laws, administrative rules and regulations, and permitting procedures that could affect the siting, construction, or operation of such facilities. Areas of primary concern include air quality, water quality, solid waste disposal, and hazardous waste disposal. All entries are part of a computerized data base built and maintained for DOE at Oak Ridge National Laboratory. (ERA citation 05:035893)

ORNL/EIS-172 PC **A14**/MF **A01**
Oak Ridge National Lab., TN.
US Department of Energy Environmental Compliance Program Handbook, Tennessee.
Sep 80, 316p
Contract W-7405-ENG-26

The US Department of Energy (DOE) has provided funding for a study of a coal conversion demonstration facility to be located in the State of Tennessee. Plans to fund the construction and operation of this facility in partnership with the city of Memphis were recently announced. This handbook identifies those Tennessee environmental laws, administrative rules and regulations, and permitting procedures that could affect the siting, construction, or operation of this facility. Areas of primary concern include air quality, water quality, solid waste disposal, and hazardous waste disposal. All entries are part of a computerized data base built and maintained for DOE at Oak Ridge National Laboratory. (ERA citation 05:035937)

ORNL/EIS-173 PC **A14**/MF **A01**
Oak Ridge National Lab., TN.
Environmental Compliance Program Handbook: West Virginia.
J. Huffstetler, B. N. Collier, A. D'Amico, C. Gross, and N. McAfee. Sep 80, 314p
Contract W-7405-ENG-26

The US Department of Energy (DOE) has provided funding for a study of a coal conversion demonstration facility to be located in the state of West Virginia. The facility will demonstrate the technical and economic feasibility of the Liquid Product Solvent Refined Coal (SRC-II) Process. This handbook identifies those West Virginia environmental laws, administrative rules and regulations, and permitting procedures that could affect the siting, construction, or operation of this facility. Areas of primary concern include air quality, water quality, solid waste disposal, and hazardous waste disposal. All entries are part of a computerized data base built and maintained for DOE at Oak Ridge National Laboratory. (ERA citation 05:035894)

PB81-105801 PC **A09**/MF **A01**
MITRE Corp., McLean, VA.
Automated Mixed Traffic Transit Market Analysis,
C. Chung, and T. Anyos. Sep 80, 194p MTR-80W00067, UMTA-VA-06-0056-80-3
Contract DTUM-60-80-C-71020
Prepared in cooperation with SRI International, Menlo Park, CA.

This report addresses the need for an automated vehicle mode that could use existing rights-of-way with minor modification. This system concept, Automated Mixed Traffic Transit (AMTT) System, refers to a system of driverless electric vehicles for mixed traffic use. Such systems would significantly decrease the labor costs associated with transit operations. Their use of existing rights-of-way indicates that system capital costs would be relatively low compared to conventional modes. The AMTT system has now reached the stage where it has become necessary to examine and identify its potential market. This report examines the characteristics and associated costs of AMTT vis-a-vis its conventional transportation alternatives. A parametric analysis is performed between electrically powered driverless AMTT and internal combustion conventional bus transit to identify appropriate service and operating conditions for AMTT. In this report, an examination of potential application areas indicates that AMTT would be less costly on a total annual cost basis than conventional bus transit in areas where fleet requirements are relatively low and high amount of service, as measured in vehicle kilometers, is desired. This report states that AMTTs may find potential application in medical centers, airports, CBD malls, some universities and colleges, new towns, large shopping centers, and in a number of recreation areas and amusement parks.

PB81-115040 PC **A05**/MF **A01**
Nebolsine Kohlmann Ruggiero Engineers, New York.
Removal of Organic Contaminants from Drinking Water Supply at Glen Cove, New York. Phase I,
Dominick D. Ruggiero, and Robert Ausubel. Nov 80, 87p EPA-600/2-80-198

This research program was initiated with the overall objective of obtaining relevant design parameters and capital and operating costs of both adsorption and aeration techniques for the removal of specific organic contaminants from the City of Glen Cove's drinking water supply. Major contaminants present are trichloroethylene, tetrachloroethylene, cis-1,2-dichloroethylene, and 1,1,1-trichloroethane. A pilot plant was constructed and operated by using water from one of the city's contaminated wells and treating a portion of it via synthetic resin (Ambersorb XE-340) and diffused aeration. Resin depths of one foot, two feet, and four feet were used, and in most cases, virgin resin lowered the concentration of all contaminants of concern to below 1 microgram/L. Steam regeneration of the exhausted resin took place, but, although promising, the results achieved in the laboratory by the resin manufacturer could not be duplicated under pilot plant conditions. Aeration tests were conducted at air to water ratios of 30:1, 20:1, 15:1 and 5:1 and 60-95 percent removals were obtained.

PB81-115297 PC **A05**/MF **A01**
North Dakota State Univ., Fargo. Engineering Experiment Station.
Pavement Performance from Historical Data.
Final rept.,
Donald A. Andersen, and James L. Jorgenson. Jun 80, 86p FHWA-RD-80-S01038
Sponsored in part by North Dakota State Highway Dept., Bismarck.

Historical performance data in terms of useful pavement life and surface condition were related to loading conditions, paving materials, and subgrade strength. The computer program 'Statistical Analysis System' (SAS) was used to explore the relationships which existed within the data. Pavement performance was evaluated in either one of two ways. For roadways which had been overlaid, the performance characteristic was taken as the useful life of the roadway between construction and overlay. For roadways which had not been overlaid since construction, the pavement surface condition parameters of roughness, cracking, and a combined rating were used to evaluate pavement performance. Some of the results of this research effort were as follows. The deterioration of pavements in North Dakota is more directly related to the age of the pavement than to the daily axle loadings or soil subgrade strength. This may be related to another finding that actual pavement life usually exceeded design life. An interesting outcome of the research which was not totally explainable was that pavements in the eastern Highway Department districts had considerably less cracking than those in the western part of the state.

PB81-115958 PC **A03**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
State-of-the-Art Summary of Incentives for Residential Water Conservation.
Final rept.,
Jacqueline Elder. Oct 80, 39p NBSIR-80-2119
Sponsored in part by Department of Housing and Urban Development, Washington, DC. Office of Policy Development and Research.

The report addresses some programs and techniques that have been developed to encourage residential water conservation. Energy conservation techniques that appear to be directly relevant to water conservation have also been included. Specific areas covered are: consumer education and information programs, feedback techniques, possible incentives in mass-metered residences, and the impact of pricing on water consumption. An extensive bibliography is included.

PB81-116428 PC **A08**/MF **A01**
Pennyslvania Univ., Philadelphia. Transportation Studies Center.
A Study on Factors Affecting Success of Suburban Mass Transit Lines.
Final rept.,
Anthony R. Tomazinis, Michael Replogle, Joseph Del Casino, Douglas Young, and Gregory Gleichman. Dec 79, 170p UMTA-PA-11-0018-80-1

The purpose of the study was to identify and analyze the factors that influence the success or fail-

ure of public transportation lines that operate mainly within the low density suburban areas, and whose purpose is to serve the local travel needs between and within suburban communities, rather than to provide corridor connections with the central business district (CBD) of the metropolitan region. This report presents the efforts of a research project on factors that effect the success levels of suburban bus transit lines, operating in low density areas and serving non-CBD-oriented, localized travel needs, on fixed-routes and schedules of service. The analysis is based on data from suburban transit routes from two distinctly different metropolitan areas, namely: Philadelphia SMSA and San Diego SMSA. The factors investigated include those expressive of the connectivity of transit lines, land use mix in the service areas, areal/spatial characteristics of the transit routes, and the characteristics of the transit users.

PB81-116469 MF **A01**
National Research Council, Washington, DC.
Port Development in the United States.
Apr 76, 256p ISBN-0-309-02448-X
Contract N00014-75-C-0711
Library of Congress catalog card no. 76-5180. Errata sheet inserted.
Paper copy available from: National Academy of Sciences, 2101 Constitution Ave., N.W., Washington, DC. 20418. PC $6.50.

The report reviews the history of domestic ports and their current status; considers the federal interest and role in ports; discusses institutional and regulatory constraints; appraises national, regional, and local requirements; and discusses the extent to which port planning can and should be done on a regional or a national basis.

PB81-116998 PC **A13**/MF **A01**
Little (Arthur D.), Inc., Cambridge, MA.
Issues and Dimensions of Freight Car Size: A Compendium.
Final rept.,
P. R. Nayak, and D. W. Palmer. Oct 80, 300p
ADL-80589-11, FRA/ORD-79/56
Contract DOT-FR-74261

An investigation is made into the effects of the size, weight, and length of freight cars on the safety and efficiency of U.S. rail transportation. A review is made of the historical and present population and usage of the U.S. freight car fleet. Distinct trends toward the purchase of larger, heavier cars and the subsequent effect on the fleet are shown. Several data bases are used in a novel fashion to provide actual derailment rates for the fleet by car-miles and ton-miles as functions of various parameters, including car type, nominal weight capacity, and length. A key finding is that, historically, the use of 100-ton capacity freight cars, in itself, has not been detrimental to the safety of U.S. rail transportation. An overview of current analyses of the causes of derailments is given, with special considerations to tank car accidents and grade-crossing accidents. Based on these analyses, technical measures for improvement are outlined. In culmination, a series of options available to the government and industry is given, with consideration to technical, regulatory, and economic impacts.

PB81-117038 PC **A15**/MF **A01**
Environmental Protection Agency, Seattle, WA. Region X.
Alaska Petrochemical Company Refinery and Petrochemical Facility, Valdez, Alaska.
Final environmental impact statement.
Apr 80, 349p EPA-910/9-79-064
Prepared in cooperation with Corps of Engineers, Washington, DC.

The objective of this project is the issuance of a New Source National Pollution Discharge Elimination System (NPDES) permit for wastewater discharge from the proposed Alaska Petrochemical Company (ALPETCO). ALPETCO proposes to build a new refinery and petrochemical facility to process 150 thousand barrels per day of Alaskan North Slope crude oil to supply the west coast petroleum fuels market. Other facilities would include a products shipping dock, the industrial wastewater treatment plant and an onsite power plant.

PB81-117137 PC **A08**/MF **A01**
Cambridge Systematics, Inc., MA.
Downtown People Mover Demonstration Program. Impact Assessment Plan: A Guide to Local Evaluations.
Final rept.,
M. Laube, L. Neumann, and E. Ruiter. Sep 80, 159p 79034.01, UMTA-IT-06-0177-80-1
Contract DOT-UT-90074
Supersedes PB-270 614.

The purpose of the Downtown People Mover (DPM) program is to demonstrate, in the downtown setting, the feasibility of a form of automated guideway transit (AGT) technology known as Shuttle Loop Transit (SLT). The DPM program provides experience in the operation of SLT systems and serves as a basis for planning future urban applications of people mover technology. The report is a guide for the evaluation of DPM projects. Areas covered include the scope of the local evaluations, the schedule of evaluation activities, and the evaluation organization and administration. The DPM evaluations cover two basic areas of assessment: operational performance and system impacts.

PB81-117202 PC **A05**/MF **A01**
American Univ., Washington, DC. Inst. for Applied Public Financial Management.
A Study of the Impacts of Water and Sewer Facilities Financed by the Farmers Home Administration on Rural Communities,
Laurence G. Bowman. Oct 80, 100p
Sponsored in part by Farmers Home Administration, Washington, DC.

The Farmers Home Administration (FmHA) is the rural development and rural credit agency of the U.S. Department of Agriculture. Included in FmHA's many loan and grant programs is its Water and Waste disposal loan and grant programs. Loans and grants are made to public bodies, nonprofit corporations, and other eligible entities to develop water and sewer facilities in rural areas and towns under 10,000 population. Loans are made at 5 percent interest for up to 40 years. A survey of one project in each FmHA district in seven states was conducted to get a handle on social, economic, and land use impacts water and sewer facilities financed by FmHA have on rural communities. Interviews with local, State and Federal water and sewer field officials tended to corroborate the survey results. Findings included: substantial increase in local commerce during the construction period, households install complete plumbing facilities, employment opportunities are likely to increase, new or improved housing is attracted, real estate values are likely to increase, population increases, improved drinking water quality and water pollution problems are mitigated. Problems associated with water and sewer lines being put into rural area and thereby attracting sprawling development, inefficient land, and destruction of important agricultural lands are discussed.

PB81-118408 PC **A23**/MF **A01**
Pacific Environmental Services, Inc., Santa Monica, CA.
Feasibility of Primary Copper Smelter Weak Sulfur Dioxide Stream Control.
Final rept.,
I. J. Weisenberg, T. Archer, F. M. Winkler, T. J. Browder, and A. Prem. Jul 80, 542p EPA-600/2-80-152
Contract EPA-68-03-2398

The major source of uncontrolled emissions of SO2 from primary copper smelters in the U.S. is the reverberatory furnace because gas strength is too low for direct processing in a sulfuric acid plant, the accepted control approach in this industry. Systems and techniques that experience indicates, either singly or in combination, can be used to control weak SO2 emissions from copper smelters are identified, analyzed and discussed. Two overall approaches to weak SO2 stream control are (1) increasing the concentration of SO2 to a range where it is feasible to produce sulfuric acid or other useable byproducts or (2) neutralizing the effluent as a waste product. Process modifications to minimize the use of air such as in-leakage control and oxygen enrichment can significantly increase SO2 concentration. The use of add on systems to concentrate the weak SO2 such as the magnesium oxide, ammonia and citrate systems have demonstrated applicability. The lime or limestone neutralization process where forced oxidation is used to produce gypsum has been demonstrated as an approach to producing a 'throw away' product. Coal reduction to sulfur also shows sufficient promise for serious consideration. Product markets are discussed.

PB81-118432 PC **A02**/MF **A01**
Industrial Environmental Research Lab., Research Triangle Park, NC.
Advances in Particle Sampling and Measurement.
Journal article,
Benjamin Y. H. Liu, Otto G. Raabe, Wallace B. Smith, Herbert W. Spencer, III, and William B. Kuykendal. Apr 80, 8p EPA-600/J-80-074
Prepared in cooperation with Minnesota Univ., Minneapolis, California Univ., Davis, Southern Research Inst., Birmingham, AL., and Joy Manufacturing Co., Los Angeles, CA. Pub. in Environmental Science and Technology, v14 p392 Apr 80.

The paper, by five authorities who contributed significantly to the second symposium on advances to particle sampling and measurement (October 1979 in Daytona Beach, FL) summarizes salient developments in the field. Current techniques were described as being expensive, complicated, and less accurate than desirable. Significant improvements would result in such benefits as: (1) better understanding and quantification of control device behavior (which could expedite the evolution of more efficient control devices); (2) more accurate assessment of environmental and health effects related to various pollution sources; and (3) use of particulate emission measurements as forms of process monitors. In addition to new developments, there was also considerable interest in inhalable particles (airborne particles with aerodynamic diameters of 15 micrometers or less) since new particulate air-quality standards based on inhalable particles are likely to be established by the EPA. Discussed during the symposium were: impactors (including virtual impactors), aerodynamic particle size analyzers, sample collection and dilution, real-time monitors and data reduction, and prototype instruments.

PB81-118812 PC **A07**/MF **A01**
Wright-McLaughlin Engineers, Denver, CO.
Technology Assessment and Research Needs of Water-Based Recreation for Urbanizing Areas.
Sep 80, 147p W81-00194, OWRT-C-90226-T(9626)(1)
Prepared in cooperation with Gates (W. E.) and Associates, Inc., Fairfax, VA.

The recreation planning process was studied with special emphasis on its application to urbanizing areas and on water-based recreation. Available technologies were examined as to how each fits within the planning process. A description of the methodology of each is given and critiqued to identify potential research areas. Nine suggested research areas were prioritized by evaluation of the probable value derived from research expenditures.

PB81-118846 CP **T14**
Forest Service, Fort Collins, CO.
Road Design System (RDS).
Software,
Harvey Krantz, Mack Litten, and Tom George. 1 Aug 80, mag tape USDA/DF-80/016
Supersedes Rept. no. USDA/DF-78/014, PB-279 500.
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions. Price includes documentation, PB-284 635.

The Broadcast Log Master File contains records reflecting call sign, station name, city, state, and zip code for licensed radio and TV broadcast facilities. The data base is converted from Honeywell system standard format BCDIC to EABCDIC, 1600 bpi, 9 track, odd parity tape on the Honeywell H-6023. The data base contains approximately 9,607 records of 144 characters in length, 10 records per block.

PB81-119133 PC **A09**/MF **A01**
Department of Transportation, Washington, DC. Office of Univ. Research.
Emerging Transportation Planning Methods,
William F. Brown, Robert B. Dial, David S. Gendell, and Edward Weiner. 1 Aug 78, 188p DOT-RSPA-DPB-50-78-2
Proceedings of the Seminar Held at Daytona Beach, Florida on December 5-9, 1976.

The U.S. Department of Transportation has sponsored research on new transportation planning techniques for several years. A number of significant advances have been made both in manual and computer procedures. Many of the new techniques were developed at universities and have distinct advantages over traditional methods. In 1976 the Office of University Research organized and conducted a 4-day seminar to instruct transportation planners in the theory, utility, and application of emerging transportation planning techniques and to encourage their widespread use. Three basic subjects were chosen for indepth examination: (1) Transportation demand forecasting techniques; (2) Transportation evaluation methods; and (3) Transportation/land use interactions. This book contains six state-of-the-art presentations and three papers summarizing the workshop discussions and question-and-answer periods.

PB81-119281 MF **A01**
National Research Council, Washington, DC. Committee on Transportation.
A Review of Short Haul Passenger Transportation.
Jan 76, 155p ISBN-0-309-02445-5
Contract DOT-OS-40022
Library of Congress catalog card no. 76-248.
Paper copy available from: Printing and Publishing Office, National Academy of Sciences, 2101 Constitution Ave., N.W., Washington, DC. 20418. PC $6.25.

The report was prepared in response to a request from the Department of Transportation for guidance relating to various elements of its High-Speed Ground Transportation Program. Accordingly, the report presents analyses, findings, conclusions, and recommendations for intercity high-speed ground transportation services, not only as they now exist but also as they might be expected to meet future needs for passenger transportation between urban centers 50 to 500 miles apart. The findings and recommendations are designed to help in defining priorities and weighing alternatives in all federally sponsored programs relating to high-speed intercity transportation systems.

PB81-119331 PC **A12**/MF **A01**
Los Angeles County Sanitation Districts, Whittier, CA.
Waste Activated Sludge Processing.
Final rept. Jun 73-Sep 76,
Scott R. Austin, Jack R. Livingston, and Liberato Tortorici. Aug 80, 254p EPA-600/2-80-147
Contract EPA-14-12-150

A study was made at pilot scale of a variety of processes for dewatering and stabilization of waste activated sludge from a pure oxygen activated sludge system. Processes evaluated included gravity thickening, dissolved air flotation thickening, basket centrifugation, scroll centrifugation, aerobic digestion, and anaerobic digestion (mesophillic and thermophillic). In addition combinations of processes were evaluated including: scroll centrifugation after anaerobic digestion, basket centrifugation after anaerobic digestion, centrifugation of mixtures of anaerobically digested primary sludge and anaerobically digested waste activated sludge, centrifugation after thermal conditioning and composting after digestion and centrifugal dewatering. Data are presented on all of the processes above and optimum economic combinations are identified.

PB81-119497 PC **A03**/MF **A01**
Lord Fairfax Planning District Commission, Front Royal, VA.
Impacts: I-66 and Growth (Summary).
Final rept.,
Thomas J. Christoffel. Mar 80, 47p
Sponsored in part by Department of Housing and Urban Development, Washington, DC., and Virginia Dept. of Housing and Community Development, Richmond.

The report summarizes the impacts on local governments; economy and transportation; land use and environment; and housing of the completion of Interstate 66 and the projected growth as a result of the outward expansion of the Washington D.C. metropolitan area. The subject area is the Lord Fairfax Planning District, located in northwestern Virginia, made up of the counties of Clarke, Frederick, Page, Shenandoah, and Warren, and the City of Winchester. The major towns are Front Royal and Luray. The report identifies external and internal factors affecting growth and their effect on the projections presented. General recommendations, applicable to all local governments, are presented as well as identifications of special impacts and recommendations for local governments. Maps identify development potentials at four interchanges. Summary sheets of recent and projected growth are shown for each jurisdiction.

PB81-119547 PC **A03**/MF **A01**
Howard (Charles) and Associates Ltd., Vancouver (British Columbia).
Literature Review for Water Supply for Urbanizing Areas.
Sep 80, 31p W81-00193, OWRT-C-90226-T(9626)(1)
Prepared in cooperation with Gates (W. E.) and Associates, Inc., Fairfax, VA.

This study involved the development of recommended strategies for future research investment in water sources for urbanizing areas, providing background information related to water supply, treatment, and distribution. To quantify the recommendations, the most recent literature in the field was summarized, classified, and analyzed to identify past research trends.

PB81-119562 PC **A03**/MF **A01**
Robinson, Farmer, Cox Associates, Richmond, VA.
Existing Base and Relevant Practices-Institutional Arrangements for Water Resource Management in Urbanizing Areas.
Sep 80, 49p W81-00195, OWRT-C-90226-T(9626)(1)
Contract DI-14-34-001-9626
Prepared in cooperation with Gates (W. E.) and Associates, Inc., Fairfax, VA.

Specific problems seen in other areas of the study (water supply, drainage, nonpoint source pollution and water-based recreation) were seen as being able to be remedied by improving the powers, geographical jurisdiction, and timing of institutions intended to manage a water resource. Research concluded as being helpful to these areas was identified in a list of twelve program research elements.

PB81-119570 PC **A04**/MF **A01**
Gates (W. E.) and Associates, Inc., Fairfax, VA.
Technology Assessment for Water Resource Management in Urbanizing Areas.
Sep 80, 74p W81-00190, OWRT-C-90226-T(9626)(1)

This technology assessment focused on an evaluation of existing technologies for water resource management in urbanizing areas and the development of recommendations for research priorities that would enhance the technologies. The water resource management elements studied were hydrology, water supply, nonpoint sources, recreation, and institutions. Two distinct approaches to water resource management were considered: (1) the economic (demand) approach; and (2) the ecologic (control) approach (carrying capacity fixed at a prescribed level).

PB81-119687 PC **A03**/MF **A01**
Environmental Protection Agency, Washington, DC. Office of Planning and Evaluation.
Economic Analysis for the Proposed Revision of Steam-Electric Utility Industry Effluent Limitations Guidelines,
Jeffrey Wasserman. Sep 80, 47p EPA-440/1-80/029-E
Prepared in cooperation with Temple, Barker and Sloane, Inc., Lexington, MA.

This report provides an economic and financial analysis of the proposed revisions to the effluent limitation guidelines for the Steam Electric utility industry. It considers the economic effects associated with BAT and pretreatment standards for once-through and recirculating cooling water as well as NSPS for both cooling water streams and fly ash transport water. The analysis was conducted at both the plant and national levels. Although the proposed regulations will require that the industry spend up to $80 million annually to comply and its cumulative capital expenditures will increase by $200 million over the period 1980-1995, these increases are very small relative to the baseline industry costs. The analysis concludes that the proposed regulations will not significantly add to the costs of generating electricity.

PB81-119752 PC **A08**/MF **A01**
Federal Railroad Administration, Washington, DC.
Preliminary Report to Congress and the Public: A Reexamination of the Amtrak Route Structure.
May 78, 165p FRA/RRI/001

After 7 years of National Railroad Passenger Corp. (Amtrak) operations, Congress requested a reexamination of the Amtrak route structure. In response, the Department of Transportation conducted an evaluation of alternative national intercity rail passenger systems. Preliminary recommendations are presented in this report for public comment. The Department has also identified several policy issues which merit public scrutiny. Preliminary recommendations are presented in the following framework: There is a historical trend for long-term decline in the common carrier share of intercity passenger travel, and a precipitous downward trend in rail patronage. Chapter 2 reports on Amtrak's progress to date in reversing these trends. Chapter 3 describes and discusses the present intercity rail passenger service system and the operation of the system. Chapter 4 discusses the methodology which produced the 5 route structure alternatives that were analyzed in this report, and graphically portrays them. Chapter 5 presents the Department's recommended route structure, offers projections for its operating performance and financial results, and describes the rationale for its selection. Chapter 6 discusses the future funding consequences of the preliminary recommendations, along with possible means of meeting funding requirements. Chapter 7 broaches significant issues deserving of public scrutiny, reflection and comment. These issues include Amtrak fare policy, the market for intercity rail passenger service and the institutional framework of Amtrak.

PB81-119760 PC **A05**/MF **A01**
Federal Railroad Administration, Washington, DC.
Final Report to Congress on the Amtrak Route System: As Required by the Amtrak Improvement Act of 1978.
Jan 79, 76p FRA/RRI/002

The report, prepared in response to Sec. 4 of the Amtrak improvement Act of 1979, presents the recommendations of the U.S. Dept of Transportation regarding the route system that should be operated by the National Railroad Passenger Corp. (Amtrak). The report recommends several major policy objectives that must be achieved if the quality and financial performance of railroad passenger service in this country is to be improved significantly. In addition to presenting final recommendations on the system of routes and services which should be operated by Amtrak, this report also recommends policy changes required to improve the quality and financial performance of intercity railroad passenger service in general. Chapter 2 reviews Amtrak's financial and operating performance. Chapter 3 presents the Department's policy recommendations. Chapter 4 describes in detail the recommended route system and the methodology used to develop the system. Chapter 5 presents the Department's estimates of required funding for Amtrak for the next 5 fiscal years and discusses the savings to be achieved by implementing the recommended system.

PB81-119885 PC **A09**/MF **A01**
Brown and Caldwell, Walnut Creek, CA.
Converting Rock Trickling Filters to Plastic Media: Design and Performance.
Final rept. 15 Mar 76-16 Mar 77,

Richard J. Stenquist, and Kathryn A. Kelly. Aug 80, 192p EPA-600/2-80-120
Contract EPA-68-03-2349

This investigation was undertaken with the objectives of reviewing the conversion of trickling filters at the Stockton, California, Regional Wastewater Control Facility from rock media to plastic media and to develop general design considerations for similar conversions which might be carried out elsewhere. The Stockton plastic media trickling filters are designed to operate in two modes: (1) to oxidize carbonaceous material during the canning season when plant loadings are high (design flow = 220,000 cu/day or 58 mgd) and, (2) to provide combined carbon oxidation-nitrification during the noncanning season when loadings are low. To evaluate plant performance, a special 1-yr sampling program was carried out.

PB81-120123 PC **A08**/MF **A01**
Systems Research and Development Corp., Research Triangle Park, NC.
CDC's National Urban Rat Control Program: Background Report and Evaluation of the First Decade, 1969-1978.
Final rept. Sep 78-Jun 80.
2 Jun 80, 153p CDC-78-001
Contract PHS-CDC-200-78-0819

The study was designed to determine the impact and effecriveness of the program and to develop and analyze alternatives for program improvements. Program performance was evaluated in terms of output production, factors affectin performance, and employment of target area residents. Data from local project reports, headquarters data as well as independent observations was utilized for evaluation purposes. Site visits were made to a national sample of local sites. The evaluation concluded that: (1) the seed money concept employed by the program has been successful in generating local support; (2) data collection and handling systems need to be automated; (3) budgetary data needs to be used at the national level; (4) local survey staff needs better training and/or retraining; and (5) program evaluation methodology should be reviewed and/or revised.

PB81-120164 PC **A10**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Procedures for the Preparation of Emission Inventories for Volatile Organic Compounds; Volume I. Second Edition,
William H. Lamason II, and Tom Lahre. Sep 80, 206p EPA-450/2-77-028-2
See also Volume 1 dated Dec 77, PB-275292.

Procedures are described for compiling emission inventories of volatile organic compounds (VOC) for use in less data-intensive models such as rollback and the Empirical Kinetic Modeling Approach (EKMA). Such inventories generally represent annual emissions (perhaps with some seasonal information) and are compiled for larger geographical areas such as counties. The basic inventory elements--planning, data collection, emission estimates, and reporting--are all discussed. No single prescriptive methodology is presented; rather, a set of procedures is described so that the agency may choose the most appropriate techniques to meet its needs in its ozone program. Various examples are included to aid the agency in the understanding and utilization of this document.

PB81-120347 PC **A10**/MF **A01**
National Oceanic and Atmospheric Administration, Washington, DC. Office of Coastal Zone Management.
Proposed Point Reyes-Farallon Islands Marine Sanctuary. Volume One.
Final environmental impact statement.
1980, 219p NOAA-80100812
See also Volume 2, PB81-120354.

This final environmental impact statement (FEIS) proposes the creation of a marine sanctuary in the waters extending shoreward to the mean high tide line or the seaward boundary of the Point Reyes National Seashore. These waters contain marine and nearshore habitats for a significant and diverse array of marine mammals and marine birds, as well as fishery, plant, and benthic resources. Marine birds and mammals, present in vast numbers on the Farallon Islands and the mainland coast, depend as much on the integrity and productivity of these adjacent ocean and estuarine waters as on the preservation of the shore areas they use for breeding, resting, and hauling out. In the face of increasing human activity in the marine area existing regulatory controls beyond the nearshore zone which do not provide long term management may not ensure comprehensive protection for aquatic animals and plants. The management of the sanctuary will include long term planning, research, resource assessment, education, coordination and regulation.

PB81-120354 PC **A12**/MF **A01**
National Oceanic and Atmospheric Administration, Washington, DC. Office of Coastal Zone Management.
Proposed Point Reyes-Farallon Islands Marine Sanctuary. Volume Two.
Final environmental impact statement.
1980, 265p NOAA-80100813
See also Volume 1, PB81-120347.

Volume two of the final environmental impact statement contains the comments received on the Draft Environmental Impact Statement prepared on the proposed Point Reyes/Farallon Islands Marine Sanctuary, and provides the Office of Coastal Zone Management's response to these comments. Written comments were received from individuals, organizations, State and local governments.

PB81-120867 PC **A10**/MF **A01**
Maryland Univ., College Park. Water Resources Research Center.
Chalk Point Cooling Tower Project: Cooling Tower Effects on Crops and Soils. Post Operational Report No. 4.
Final rept. FY 1979,
Charles L. Mulchi, Duane C. Wolf, and James A. Armbruster. Jul 79, 225p SR-12, PPSP-CPCTP-29
See also report dated Aug 77, PB-284 094.Portions of this document are not fully legible.

The objective of the investigation was to examine the impact of saline aerosol emissions from the cooling tower at Chalk Point on crops and soils in the region. Dustfall, rainfall, crops and soils information obtained from a network of twelve research sites near the Chalk Point facility during the period April, 1973 through March, 1979 was presented and discussed. Also, summarized in the report are wind frequency results and power plant operational data for the study period. Dustfall particulate data suggested that the operation of Units 1 and 2 at or near design capability exceeded the capability of the emission control system to remove particulates from the stack gasses. Dustfall sodium and chloride data show a slight shift in the ratio of Cl/Na since Unit 3 became operational; however, no significant changes in deposition rates for these elements were observed.

PB81-120891 PC **A07**/MF **A01**
Florida State Dept. of Transportation, Gainesville. Office of Materials and Research.
Instrumentation and Testing of the Florida Econocrete Test Road.
Interim rept. 1977-79,
William R. Brown, III. Nov 79, 130p FL/DOT/OMR-79/209, FHWA/RD-80-S01026

An experiment concrete pavement/econocrete base test road was instrumented and tested. Pavement performance and structural tests were performed to determine relative pavement strength, stress transfers, and design criteria as well as rideability. Test methods included Mays meter, Chloe profilometer, Benkelman beam, Dynaflect, and static and dynamic load tests using strain gages, embedment gages, and verticle displacement transducers. The load tests data were recorded using a high speed digital acquisition system with magnetic tape storage and computer data reduction and graphics. An experimental seismic test method was also used to evaluate the pavements. Instrumentation successes and problems are discussed.

PB81-120941 PC **A11**/MF **A01**
Culp/Wesner/Culp, El Dorado Hills, CA.
Recommendations from Value Engineering Studies on Wastewater Treatment Works.
Technical rept.,
Robert B. Williams, Robert G. Gumerman, William R. Whittenberg, and Nancy E. Heim. Sep 80, 229p EPA-430/9-80-010, EPA/MCD-69
Contract EPA-68-01-5938

This publication summarizes the best ideas/recommendations from 93 value engineering (VE) reports which were completed under EPA's mandatory VE program for 75 construction grant projects. Data abstracted from these reports provided the basis for an overall evaluation of the VE program. Application of VE ideas/recommendations and evaluation results presented in this publication should enhance the effectiveness of VE in the design of future wastewater treatment facilities.

PB81-121055 PC **A11**/MF **A01**
Resources Development Consultants, Inc., Fort Collins, CO.
Maximizing the Utilities of Social Criteria for Urban Water Management and Planning.
Completion rept.,
Duane W. Hill. Sep 80, 250p W81-00264, OWRT-C-4222(9033)(1)
Contract DI-14-31-0001-9033

A research effort was mounted to develop and test social criteria for effective use in the water management and planning community. The research design employed a space-distance model which involved factor analytical software for comparing empirical data generated from five community household samples. The machine output was then used to assess data relationships and to identify those social variables (i.e., those control points) which channel and direct other variables. Research results indicated: (a) that factor scores from Q-Sort factor analysis programming offer the water management and planning community a ready means for estimating, (1) interactive effects among social variables and (2) which variables are the most probable controllers.

PB81-121071 PC **A02**/MF **A01**
Radian Corp., Austin, TX.
The Measurement of Hydrocarbon Emissions from Fugitive Sources in Petroleum Refineries.
Journal Article, Mar 76-Jan 80.
Robert G. Wetherold, Donald D. Rosebrook, Lloyd P. Provost, and Atly Jefcoat. 1980, 8p EPA-600/J-80-093, IERL-RTP-P-356
Contracts EPA-68-02-2147, EPA-68-02-2665
Pub. in American Institute of Chemical Engineers, v76 n196 p389-394 1980.

The paper gives preliminary results of measurements of hydrocarbon emissions from a number of petroleum refineries. Sampled sources included valves, flanges, pump and compressor seals, pressure relief devices, drains, and cooling towers. The paper discusses sampling techniques and describes the analyses and correlation of the sampling data. Data obtained to date supported the following conclusions: (1) Emissions form flanges are not significant. (2) Compressor seals have the highest average leak rate of the baggable sources. (3) Valves contribute more emissions than any other single baggable source. (4) Most leakage occurs from a relatively few sources of each source type. (5) The type of process stream has a substantial effect on the source emissions. (6) Losses from cooling towers are quite low.

PB81-121097 PC **A03**/MF **A01**
MITRE Corp., McLean, VA. METREK Div.
Conventional Combustion Environmental Assessment Program.
Journal article Mar 77-May 78,
Wade H. Ponder, and Deepak C. Kenkeremath. 1980, 31p EPA-600/J-80-123, IERL-RTP-P-118
Contracts EPA-68-01-3188, EPA-68-01-3539
Pub. in AIChE Symposium Series 196, v76 p66-94 1980.

The report describes the development and initial results of EPA's Conventional Combustion Pollutant Assessment (CCEA) program planning effort, a recently established EPA program to consolidate the several segments of its research on the environmental effects of pollutants from conventional combustion processes into a comprehensive integrated effort. (In the past, much of EPA's environ-

mental effects research has been performed in conjunction with control technology development.) Fossil fuels are now the Nation's principal source of energy for industrial, commercial, and residential use. The conventional combustion of fossil fuels and their derivatives is likely to remain our primary means of obtaining useful energy for several decades. EPA has, since its inception, conducted research on the environmental effects of fossil fuel combustion. The three principal purposes of such research are: (1) to assess the health and environmental effects caused by the release of combustion pollutants; (2) to define the need for technology to control the release of these pollutants; and (3) to develop standards to limit emissions.

PB81-121105 PC **A10**/MF **A01**
Environmental Protection Agency, Washington, DC.
Chemical Testing and Assessment Research Committee - Research Strategy 1979-1985.
Oct 80, 209p EPA-600/9-80-049

This document was developed by the Chemical Testing and Assessment Research Committee and it presents a multi-year strategy for ORD's programs on Toxic Substances. This strategy is intended to serve as a basis for preparing each fiscal year's program proposals and for reviewing the progress of ORD's ongoing effort. The document will be updated annually by the Research Committee to refine the strategy and help assure the program's responsiveness to emerging concerns and priorities.

PB81-121113 PC **A03**/MF **A01**
Environmental Protection Agency, Washington, DC. Municipal Construction Div.
Municipal Wastewater Treatment Works Construction Grants Program. Program Requirements Memoranda.
Technical rept.
Aug 80, 43p EPA-MCD-02.10

This handbook contains the replacement pages and policy directive after the Manual of References was published. This represents the tenth in a series of Program Requirements Memoranda for the construction of sewage treatment plants.

PB81-121279 PC **A04**/MF **A01**
Arizona Water Resources Research Center, Tucson.
A Five-Year Plan for Water Resources Research in Arizona.
Oct 80, 71p W81-00282

Arizona's underlying water resources problem is the perennial overdraft of groundwater. The legal basis of water use is largely the key to this problem, but priority research is being designed to help. Future research will be aimed at: (1) greater efficiency of agricultural, industrial, and urban water; (2) broader implementation of water conservation measures and water reuse; and (3) ways of dealing both physically and legally with the continuing groundwater recharge/depletion imbalance. Water quality problems emphasis will be placed on the protection of groundwater and surface water, and on effective methods for monitoring and maintaining water quality standards. Three kinds of water depletion forecasts are given to estimate Arizona's water needs for 1970-2020.

PB81-121923 PC **A08**/MF **A01**
Midwest Research Inst., Kansas City, MO.
Technology for Use in 'Automated' Speed Enforcement.
Interim rept.,
William D. Glauz, and Robert R. Blackburn. Jun 80, 170p 4615-S(13), DOT-HS-805 545
Contract DOT-HS-8-02030

The report concerns the identification of technologies that may be applicable to speed enforcement and a preliminary assessment of their possible utility in the U.S. The study emphasizes technologies that are in common use in Europe and elsewhere, but are relatively unknown in the U.S. The findings reflect information from the literature and elsewhere; personal visits to a number of foreign law enforcement agencies and manufacturers; and a quantitative rating system. The most common non-U.S. technology utilizes Doppler radar aimed diagonally across the road, rather than down the road as is the case with American systems, giving it a number of technological advantages. This, and several other technologies identified, can be used in combination with a camera to obtain photographic evidence, or to operate automatically without an officer in attendance. It is concluded that these technologies are technically much superior to the systems presently used in the U.S. and, although they are more expensive, offer potential cost-effectiveness advantages. However, there are some legal and public opinion concerns that must be dealt with, and field trials in the U.S. are strongly recommended.

PB81-122103 PC **A06**/MF **A01**
Oregon State Univ., Corvallis. Water Resources Research Inst.
Water Resources Research Plan for Oregon for the Period 1982-1987.
31 Oct 80, 110p W81-00284

Oregon's major water-related problems involve seasonal, geographic, and year-to-year maldistribution between water supply and competing water uses with recurring water shortage and excessive runoff. The State's largest consumptive use will always be for irrigation but other problem areas include river water quality; lake and reservoir water quality; bays, estuaries, and wetlands; planning and management of water resources; and forested watershed management. Under water use, priority research areas will cover water rights transfers; Columbia River water use; agricultural, municipal, and industrial reuse; and water pricing policies. General problems research will be used to evaluate irrigation systems and application methods and to analyze recent changes in Oregon's water laws and institutions.

PB81-122129 PC **A05**/MF **A01**
Environmental Protection Agency, Research Triangle Park, NC. Office of Air Quality Planning and Standards.
Review of New Source Performance Standards for Phosphate Fertilizer Industry - Revised.
Nov 80, 83p EPA-450/3-79-038R

Since promulgation of new source performance standards (NSPS) for fluoride control in the phosphate fertilizer industry, in 1975, commercial applications of a few new systems that reduce air pollution from phosphate plants have been reported. These include scrubbing system modifications that reduce the size of ponds used to cool process water, and reduce pond fluoride emissions. Also, a proprietary new process produces a stable granular triple superphosphate (GTSP) directly. This process reduces or eliminates the emissions of fluorides and fugitive particulate during the curing, storage period. The new GTSP process also eliminates the scrubbing of certain process gas, thus reducing required cooling pond area and pond fluoride emissions. There is currently insufficient process experience and source test data for firm conclusions about fluoride control potential. The recommendation is therefore made not to develop NSPS revisions now, but to assess additional developments in this industry in four years, and then reconsider possible revision.

PB81-122202 PC **A99**/MF **A01**
Denver Research Inst., CO.
Second Symposium of the Transfer and Utilization of Particulate Control Technology: Volume I. Control of Emissions from Coal Fired Boilers.
Rept. for Jun 79-Jun 80,
F. P. Venditti, J. A. Armstrong, and Michael Durham. Sep 80, 639p EPA-600/9-80-039A, IERL-RTP-1061
Grant EPA-R-805725
See also Volume 2, PB81-122210.

The proceedings document the approximately 120 presentations at the EPA/IERL-RTP-sponsored symposium, attended by nearly 800 representatives of a wide variety of companies (including 17 utilities). The keynote speech for the 4-day meeting was by EPA's Frank Princiotta. This volume includes electrostatic precipitators, fabric filters, and scrubbers.

PB81-122210 PC **A23**/MF **A01**
Denver Research Inst., CO.
Second Symposium on the Transfer and Utilization of Particulate Control Technology: Volume II. Electrostatic Precipitators.
Rept. for Jun 79-Jun 80,
F. P. Venditti, J. A. Armstrong, and Michael Durham. Sep 80, 537p EPA-600/9-80-039B, IERL-RTP-1062
Grant EPA-R-805725
See also Volume 4, PB81-122228.

The proceedings document the approximately 120 presentations at the EPA/IERL-RTP-sponsored symposium, attended by nearly 800 representatives of a wide variety of companies (including 17 utilities). The keynote speech for the 4-day meeting was by EPA's Frank Princiotta. This volume contains four different aspects on electrostatic precipitators. They are as follows: fundamentals, operation and maintenance, advanced design, and industrial applications.

PB81-122228 PC **A24**/MF **A01**
Denver Research Inst., CO.
Second Symposium on the Transfer and Utilization of Particulate Control Technology: Volume IV. Special Applications for Air Pollution Measurement and Control.
Rept. for Jun 79-Jun 80,
F. P. Venditti, J. A. Armstrong, and Michael Durham. Sep 80, 557p EPA-600/9-80-039D, IERL-RTP-1064
Grant EPA-R-805725
See also Volume 1, PB81-122202 and report dated Feb 79, PB-295 228.

The proceedings document the approximately 120 presentations at the EPA/IERL-RTP-sponsored symposium, attended by nearly 800 representatives of a wide variety of companies (including 17 utilities). The keynote speech for the 4-day meeting was by EPA's Frank Princiotta. This volume discusses high temperature and pressure applications, fugitive emissions, and measurement and analysis of particles.

PB81-122632 PC **A99**/MF **A01**
Environmental Protection Agency, Washington, DC. Effluent Guidelines Div.
Development Document for Proposed Effluent Limitations Guidelines, New Source Performance Standards, and Pretreatment Standards for the Inorganic Chemicals Manufacturing Point Source Category,
Elwood E. Martin, Dwight Hlustick, and G. Edward Stigall. Jun 80, 1182p EPA-440/1-80-007B

This document presents the findings of a study of the Inorganic Chemicals Manufacturing Point Source Category for the purpose of developing effluent limitations and guidelines for existing point sources and standards of performance and pretreatment standards for use and existing point sources to implement Sections 301, 304, 306, 307, 308, and 501 of the Clean Water Act (the Federal Water Pollution Control Act Amendments of 1972, 33 USC 1251 et. seq., as amended by the Clean Water Act of 1977, P.L. 95-217) (the 'Act'). This document was also prepared in response to the Settlement Agreement in Natural Resources Defense Council, Inc. v. Train, 8 ERC 2120 (D.D.C. 1976), modified March 9, 1979. The information presented in this document provides technical support for regulations proposed in July 1980 for 11 subcategories of the Inorganic Chemicals Manufacturing Point Source Category. Descriptions of the treatment technologies appropriate for achieving the limitations as well as supporting data, cost estimates, and rationale for the development of the proposed effluent limitations, guidelines, and standards of performance are contained in this report.

PB81-122673 PC **A05**/MF **A01**
Hydrotechnic Corp., New York.
Study of the Potential for Water Reuse in the Steel Industry,
D. D. Ruggiero, H. Hofstein, A. H. Danzberger, J. T. Chu, and M. Strully. Sep 80, 83p W81-00039, OWRT-C-80141(8816)(1)
Contract DI-14-34-0001-8816
Also pub. as Office of Water Research and Technology, Washington, DC. rept. no. OWRT/RU-80/2.

This report presents the results of an engineering study of water use in the steel industry in the United States. Water requirements are presented with respect to quality and quantity for the major production processes in integrated steel plants. Water requirements are presented on a national level for iron and steel production in 1977 and anticipated production for the years 1985 and 2000 under three environmental criteria, i.e., those mandated under PL 96-217 of Best Practicable Technology Currently Available (BPT), Best Available Technology Economically Achievable (BAT) and Zero Discharge of Pollutants. It is shown that, to meet these three criteria, increased recirculation of water within integrated steel plants is necessary and, as a result of this recirculation, the quantities of fresh water required is decreased. The report describes how increased water reuse within an integrated steel plant may be accomplished and how geographically proximate industries may utilize each other's wastewaters.

PB81-123580 PC **A02**/MF **A01**
Public Technology, Inc., Washington, DC.
Elderly and Handicapped Transportation: Chief Executive's Summary.
Final rept.
Sep 79, 24p DOT-I-79-29
Contract DOT-05-80076

The report very briefly profiles the transportation handicapped, examines legislative responses to their needs, and describes actual programs and services implemented by local government.

PB81-123598 PC **A03**/MF **A01**
Public Technology, Inc., Washington, DC.
Elderly and Handicapped Transportation: Information Sourcebook.
Final rept.
Sep 79, 35p DOT-I-79-31
Contract DOT-05-80076

The document, intended as an introduction to information sources on elderly and handicapped transportation, includes the following five chapters: (1) Federal Agency Contacts, which lists Federal agencies that provide assistance with respect to various aspects of transportation for elderly and handicapped persons and agency contacts. (2) Interest Group Contacts, which lists interest groups that are concerned with the provision of transportation for elderly and handicapped persons and interest group contacts. (3) Vehicle Manufacturers, which lists manufacturers of lift-equipped and non-lift-equipped vehicles. (4) Selected Approaches to Providing Transportation for Elderly and Handicapped Persons, which includes brief descriptions of 10 local approaches to providing transportation for elderly and handicapped persons. (5) Annotated Bibliography, which presents a selection of material that has been published on various aspects of transportation for elderly and handicapped persons.

PB81-123606 PC **A07**/MF **A01**
Public Technology, Inc., Washington, DC.
Elderly and Handicapped Transportation: Eight Case Studies.
Final rept.
Sep 79, 127p DOT-I-79-32
Contract DOT-05-80076

The report, while not covering the complete range of approaches to the problem of providing more adequate transportation for and increasing the mobility of elderly and handicapped persons, is illustrative of a variety of approaches that have been taken in communities of all sizes throughout the United States. Case studies of: Austin, Texas; Pomona Valley, California; Akron, Ohio; Chattanooga, Tennessee; Bridgeport, Connecticut; Spokane, Washington; Brockton, Massachusetts, and San Mateo County, California are presented.

PB81-123614 PC **A02**/MF **A01**
Public Technology, Inc., Washington, DC.
Elderly and Handicapped Transportation: Planning Checklist.
Final rept.
Sep 79, 23p DOT-I-79-30
Contract DOT-05-80076
See also Report dated Mar 79, PB-297 289.

The report sets forth in brief form the relevant Federal legislation pertaining to transportation for elderly and handicapped persons, the principal Federal sources of funding, and the basic steps in the process for developing transportation services that are responsive to the needs of the elderly and handicapped persons.

PB81-123721 PC **A04**/MF **A01**
Vermont Water Resources Research Center, Burlington.
Vermont Water Resources Research Center Five Year Plan for Water Resources Research and Development,
Michael Long, and E. Alan Cassell. Oct 80, 57p W81-00283

Vermont has identified eight priority research areas which are: (1) acid precipitation, (2) allocation of water resources, (3) data base for water resource management, (4) groundwater management, (5) lakes and wetlands management, (6) land runoff, (7) management of toxic and hazardous materials, and (8) waste water management and drinking water supply. Vermont has an average annual precipitation of 42 inches and is generally decentralized both culturally and hydrologically. This decentralization presents special management problems due to the economic limitations on small communities in the provision of facilities for water supply and waste water treatment. Some problems such as acid precipitation and toxic and hazardous materials management originate outside of the State and need regional research efforts.

PB81-123739 PC **A05**/MF **A01**
Sterling Systems, Inc., McLean, VA.
Advanced New Community Simulation System: Residential Scoring Model; Analysis, Validation and Verification.
Final rept.,
David Cheng, and Paul Lumpkin. Apr 80, 85p
Contract HUD-H-4422
See also PB81-123754, and PB81-123762.

The Advanced New Community Simulation (NUCOMS) System is a computer-based set of models and data designed to provide a comprehensive economic and financial evaluation of a proposed new town or community plan. It contains the following major components: Regional Economic Model; Sector Model; Community Models (they include the Retail Demand Model, Industrial Demand Model, Office Space Demand Model and Residential Demand Model); Residential Scoring Model; Fiscal Impact Model; Financial Model; and Economic-Financial Interface Model. The Residential Scoring Model develops a residential attractiveness score based on sets of factors that substantially influence residential location, preference and choice.

PB81-123754 PC **A03**/MF **A01**
Sterling Systems, Inc., McLean, VA.
Advanced New Community Simulation System: Residential Demand Model; Analysis, Validation and Verification.
Final rept.,
Adeola Molajo. Aug 80, 47p
Contract HUD-H-4422
See also PB81-123739.

The Residential Demand Model calculates the capture rate for the new community based on the housing starts in the market area and the residential attractiveness scores determined by the Residential Scoring Model.

PB81-123762 PC **A10**/MF **A01**
Sterling Systems, Inc., McLean, VA.
Advanced New Community Simulation System: Sector Model and Sector Model Interfaces; Analysis, Validation and Verification.
Final rept.,
Peter Andrejev. Mar 80, 214p
Contract HUD-H-4422
See also PB81-123739.

The purpose of the report is to provide the NUCOMS System user with the information required to access the Sector Model and its associated interfaces. The purpose of the Sector Model is to provide projections for employment, population, new household construction and income distribution for geographic sectors such as counties.

PB81-123796 PC **A17**/MF **A01**
Princeton Univ., NJ. Dept. of Civil Engineering.
Workshop on the Physical Behavior of Oil in the Marine Environment, Held at Princeton University, Princeton, New Jersey, on May 8-9, 1979,
Christopher L. Kerr, and Celso S. Barrientos.
1979, 386p NOAA-80100815

A workshop on the Physical Behavior of Oil in the Marine Environment, was held at Princeton University, New Jersey on May 8-9, 1979. Workshop presentations were grouped into the following sections: experimental study, theoretical research, operational forecasts, risk assessment, physical behavior in cold regions and oceanography and meteorology.

PB81-123838 PC **A02**/MF **A01**
Bowdoin Coll., Brunswick, ME.
The Benefits of Air and Water Pollution Control: A Review and Synthesis of Recent Estimates.
Executive summary,
A. Myrick Freeman, III. Dec 79, 19p
Sponsored in part by Council on Environmental Quality, Washington, DC. See also PB80-178759.

The report has four major objectives. The first is to provide a critical review of those previous studies which have attempted to estimate air and water pollution control benefits in monetary terms or which might provide an empirical basis for making such an estimate. This review evaluates the theoretical framework underlying each of the estimates, the validity of the estimation technique, and the adequacy of the data.

PB81-124190 PC **A02**/MF **A01**
Louisiana Water Resources Research Inst., Baton Rouge.
Five-Year Plan for the Louisiana Water Resources Research Institute, 1980-85.
Oct 80, 17p W81-00335

Thirteen priority water research areas are identified for Louisiana: (1) effects of surface waste water disposal, (2) deep well waste disposal, (3) water conservation, (4) desalting, (5) water reuse, (6) energy-related water use, (7) groundwater, (8) aquifer management, (9) urban water, (10) environmental protection, (11) rural water, (12) water law, and (13) subsidence. A five year funding summary of the probable minimum expansion of work at the Institute is given.

PB81-124356 PC **A06**/MF **A01**
Nebraska Water Resources Center, Lincoln.
Nebraska Water Resources Center Five-Year Water Resources Research Program, 1982-1987.
Oct 80, 106p W81-00337

Nebraska ground and surface water systems were estimated to contain approximately two billion acre-feet of water, and its long-term average precipitation to be 86 million acre-feet. Despite abundant water resources, not all areas of the State have an adequte or useful water source. Nebraska State water problems have been identified under five categories: water quantity; water quality; distribution and redistribution; water use efficiency and productivity; and legal-institutional. Some State areas have limited groundwater and no access to lakes/streams. Nebraska's Section 208 Water Quality Management Plan lists eleven sources of State water quality problems, with sedimentation identified as the most important.

PB81-125122 PC **A05**/MF **A01**
Guam Univ., Agana. Water Resources Research Center.
Five-Year Water Research and Development Plan for Guam and Micronesia FY 82 through FY 86.
Oct 80, 81p W81-00333

A common problem and water research priority for Guam, Saipan, and Micronesia is groundwater yield. Guam gives secondary priority to baseline water quality data and the impact of pollutants on receiving water quality. Tertiary priorities for Guam are water demand, potential conflicts over surface water use, and the feasibility of low-head hydroelectric power generation. Saipan gives secondary

priority to baseline water quality data and Micronesia gives secondary priority to the operation of waste water treatment plants and conservation. Northern Guam has a broad limestone plateau and the southern half is a dissected volcanic upland fringed with limestone. These limestone areas have high hydraulic conductivity and porosity. The five-year plan includes information on the problems to be researched.

PB81-125791 PC **A02**/MF **A01**
Rocky Mountain Forest and Range Experiment Station, Fort Collins, CO.
Sterilization of Dominant Males Will Not Limit Feral Horse Populations.
Forest Service research paper (Final),
Kurt J. Nelson. Dec 80, 12p FSRP-RM-226

Sterilization of dominant stallions is impractical for controlling feral horse populations. Evidence does not support the premise that reproductive units are stable, with one male and many females. Individual horses, including productively active females, move between bands during the breeding season.

PB81-126518 PC **A07**/MF **A01**
Mississippi State Univ., Mississippi State. Water Resources Research Inst.
Five-Year Water Resources Research and Development Plan: Fiscal Years 1982-1986.
1980, 142p W81-00289
Contract DI-14-34-0001-0126

The Mississippi Water Resources Research Institute has established a documented list of Mississippi water resources and related land-use problems. Identified problems include increased water demands causing geographically critical shortages annually; water quality impact on community surface waters by inadequate waste water treatment capacities and stormwater runoff; river basin flooding and erosion/sedimentation; and interstate and industry/municipality/agriculture intrastate conflicts over water use. These problems are discussed in the report.

PB81-128514 PC **A12**/MF **A01**
SCS Engineers, Inc., Redmond, WA.
Cost Comparisons of Treatment and Disposal Alternatives for Hazardous Wastes. Volume I.
Final rept.,
Warren G. Hansen, and Howard L. Rishel. Dec 80, 272p EPA-600/2-80-188
See also Volume 2, PB81-128522.

Unit costs are estimated for 16 treatment and 5 disposal techniques applicable to hazardous wastes from the organic chemicals, inorganic chemicals, and electroplating and metal finishing industries. Each technology was evaluated by unit processes or modules, and computer-linked models developed for calculating capital and operating costs at the unit process level. Costs were aggregated at the technology level including applicable indirect costs and maintenance costs. Data files were designed to indicate economies of scale for 5 levels of throughput. Life cycle average unit costs are presented in both tabular and graphic form.

PB81-128522 PC **A05**/MF **A01**
SCS Engineers, Inc., Redmond, WA.
Cost Comparisons of Treatment and Disposal Alternatives for Hazardous Wastes. Volume II. Appendices.
Final rept.,
Warren G. Hansen, and Howard L. Rishel. Dec 80, 100p EPA-600/2-80-208
Contract EPA-68-03-2754
See also Volume 1, PB81-128514.

Treatment and disposal alternatives and costs for hazardous wastes from the organic chemicals, inorganic chemicals, and electroplating and metal finishing industries are evaluated. The 16 treatment and 5 disposal technologies were based on applicability to the industry categories, availability of cost and performance data, and effectiveness in reducing or eliminating hazardous waste constituents. Costs were aggregated at the technology level and entered in computer-linked models at the unit cost or component level. Volume II contains applicable portions of the Resource Conservation and Recovery Act, capital unit cost and operation/maintenance cost data files, curve fitting for cost files, module descriptions, and system variable equations. Volume II is intended for those desiring the supporting data for Volume I.

PB81-800377 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Cadmium Pollution. November, 1977-October, 1980 (Citations from the NTIS Data Base).
Rept. for Nov 77-Oct 80,
Diane M. Cavagnaro. Nov 80, 292p
Supersedes PB80-800543, and NTIS/PS-78/1152. See also 1964-November, 1977, NTIS/PS-78/1151.

Air and water pollution by cadmium are covered in this bibliography. Topics include sources, control techniques, emissions, transport properties, toxicity, effects on plants, animals, and humans, and detection and analysis. (This updated bibliography contains 178 citations, 84 of which are new entries to the previous edition.)

PB81-800385 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Dial-A-Ride. 1964-October, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-Oct 80,
Edith Kenton. Nov 80, 161p
Supersedes PB80-800204, and NTIS/PS-78/1021.

Descriptions and discussions are presented of the dial-a-ride concept, the benefits and costs of the demand responsive transportation systems, experimental designs, scheduling, travel patterns, vehicles, computerized modelling, communication systems, demand forecasting, fare structures, ridership, management, problems, and other related topics. (This updated bibliography contains 154 citations, 18 of which are new entries to the previous edition.)

PNL-SA-8431 PC **A03**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Hybrid Regional Air Pollution Models.
R. L. Drake. Mar 80, 34p CONF-7910183-1
Contract AC06-76RL01830
Workshop on regional air pollution modeling, Port Deposit, MD, USA, 29 Oct 1979.

This discussion deals with a family of air quality models for predicting and analyzing the fine particulate loading in the atmosphere, for assessing the extent and degree of visibility impairment, and for determining the potential of pollutants for increasing the acidity of soils and water. The major horizontal scales of interest are from 400km to 2000km; and the time scales may vary from several hours, to days, weeks, and a few months or years, depending on the EPA regulations being addressed. First the role air quality models play in the general family of atmospheric simulation models is described. Then, the characteristics of a well-designed, comprehensive air quality model are discussed. Following this, the specific objectives of this workshop are outlined, and their modeling implications are summarized. There are significant modeling differences produced by the choice of the coordinate system, whether it be the fixed Eulerian system, the moving Lagrangian system, or some hybrid of the two. These three systems are briefly discussed, and a list of hybrid models that are currently in use are given. Finally, the PNL regional transport model is outlined and a number of research needs are listed. (ERA citation 05:034131)

PNL-3400 PC **A14**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
MAP3S Precipitation Chemistry Network. Third Periodic Summary Report, July 1978-December 1979.
May 80, 306p
Contract AC06-76RL01830

The MAP3S Precipitation Chemistry Network consists of eight collection sites in the northeastern United States. Precipitation event samples are collected by cooperating site operators, using specially developed sampling equipment. In this, the third periodic summary report, are listed field and concentration data for the period July 1, 1978 to December 31, 1979. Over three years' samples have been collected at most of the sites, which went into operation between September 1976 and October 1978. Samples are chemically analyzed at a central laboratory for 13 pollutant species. Weekly samples in addition to event samples were collected over a 1 1/2 year period at three sites. Analysis of one year's results indicates that there is little difference between the concentrations collected by the two methods in terms of seasonal precipitation-weighted means for all species except dissolved SO sub 2 . Event samples tend to average about 25% higher in SO sub 2 than weekly samples. (ERA citation 05:037149)

SERI/TP-743-826 PC **A02**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Environmental Aspects of Solar Energy Technologies.
C. L. Strojan. Sep 80, 21p CONF-800867-2
Contract AC02-77CH00178
Symposium on energy and ecology in the West, Tucson, AZ, USA, 4 Aug 1980.

Solar energy technologies have environmental effects, and these may be positive or negative compared with current ways of producing energy. In this respect, solar energy technologies are no different from other energy systems. Where solar energy technologies differ is that no unresolvable technological problems (e.g., CO sub 2 emissions) or sociopolitical barriers (e.g., waste disposal, catastrophic accidents) have been identified. This report reviews some of the environmental aspects of solar energy technologies and ongoing research designed to identify and resolve potential environmental concerns. It is important to continue research and assessment of environmental aspects of solar energy to ensure that unanticipated problems do not arise. It is also important that the knowledge gained through such environmental research be incorporated into technology development programs and policy initiatives. (ERA citation 05:036292)

UCRL-84066 PC **A03**/MF **A01**
Lawrence Livermore National Lab., CA.
H Sub 2 S Evolution from Colorado Oil Shale.
A. K. Burnham, N. K. Bey, and G. J. Koskinas.
Aug 80, 36p CONF-800977-1
Contract W-7405-ENG-48
ACS symposium series on oil shale, tar sands, and related materials, Pittsburgh, PA, USA, 30 Sep 1980.

Most of the sulfur in oil shale occurs in pyrite and a smaller amount is contained in the kerogen. It is demonstrated that the major source of H sub 2 S during oil shale pyrolysis is from the reaction of pyrite with organic matter. Results are presented for the evolution of H sub 2 S from Colorado oil shale heated at 5 exp 0 C/min under autogenous (self-generated), argon, steam, and hydrogen atmospheres at atmospheric pressure. In an autogenous atmosphere, most of the H sub 2 S is evolved between 400 and 500 exp 0 C. Addition of finely ground pyrite increases the amount but does not change the evolution profile of H sub 2 S. In an argon atmosphere, however, added pyrite causes a substantial increase in H sub 2 S evolution only between 475 and 525 exp 0 C. Similar reaction characteristics were observed with large-grained natural pyrite in a Tract C-a oil shale. These results also demonstrate the importance of intimate contact between the pyrite and organic material. In a steam atmosphere, pyrite is oxidized to iron oxides and the H sub 2 S evolution increases substantially. In some samples, essentially all the initial sulfur is evolved as H sub 2 S at temperatures below 800 exp 0 C. Finally, we discuss the thermodynamic limitations on the observed reactions under retort conditions. (ERA citation 05:036006)

UCRL-84547 PC **A02**/MF **A01**
Army Electronics Research and Development Command, White Sands Missile Range, NM. Atmospheric Sciences Lab.
Meteorological Measurement System for Support of Atmospheric Propagation Studies.
J. Hines, and G. Bingham. 1980, 9p CONF-8003101-1
Contract W-7405-ENG-48
Workshop on millimeter and submillimeter atmospheric propagation application to radar and missile

systems, Redstone Arsenal, AL, USA, 22 Mar 1980.

In support of laser system design and testing, a system for meteorological data acquisition, transmission, and processing was designed, developed, and implemented. The system covers optical turbulence, wind, gases, and particulates. The system has been in operation for 2 years and is currently being used to characterize the atmosphere at a high energy laser facility. Optical turbulence instrumentation includes point measurements with a spatial temperature probe, integrated measurements over a 180-m horizontal path with an optical scintillometer, and vertical profiles up to 600 m with an acoustic sounder. Wind speed and direction are monitored with an anemometer system. Gases currently being monitored for concentration include water vapor, ozone, total hydrocarbons, methane, nitrous oxide, and carbon dioxide. Particulate measurements include those of size distribution, mass concentration, and scattering coefficient. Stations at each data acquisition site acquire, preprocess, convert, transmit, and/or store data. The stations are linked to a central computer through bidirectional computer-controlled data links. The central computer handles the data collection, archiving, and formatting. (ERA citation 05:037142)

13C. Construction Equipment Materials, and Supplies

CONF-800969-1 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Testing Program for Determining the Mechanical Properties of Concrete to Temperatures of 621 exp 0 C.
C. B. Oland, D. J. Naus, and G. C. Robinson.
1980, 27p
Contract W-7405-ENG-26
American Concrete Institute fall convention, San Juan, Puerto Rico, 24 Sep 1980.

Concrete temperatures in a Liquid Metal Fast Breeder Reactor (LMFBR) in excess of normal code limits can result from postulated large sodium spills in equipment cells. Elevated temperature concrete property data which may have application for providing a basis for the design and evaluation of such postulated accident conditions is limited. Data thus needed to be developed commensurate with LMFBR plant applications for critical physical and mechanical concrete properties under prototypic thermal accident conditions. A test program was conducted to define the variations in physical and mechanical properties of a limestone aggregate concrete and a lightweight insulating concrete exposed to elevated temperatures. Five test series were conducted: unconfined compression, shear, rebar bond, sustained loading (creep), and thermal properties. Testing procedures for determining the mechanical properties of concrete from ambient to 621 exp 0 C (1150 exp 0 F) are described. Ther thermal properties tests are discussed in a separate paper which is also being presented at this conference. (ERA citation 05:035196)

PB81-114449 PC **A04**/MF **A01**
Swedish Council for Building Research, Stockholm.
Shape and Surface of Mineral Grains Automatically Determined for Mortar and Concrete Purposes Through Image Analysis,
Tor H. Hagerman, Kenneth Balck, and Marianne Lillieskold. 1980, 61p ISBN-91-540-3303-9, D26:1980

For a long time it has been attempted to obtain sufficient information about the shape and surface qualities of mineral and rock grains, i.a. of the material of concrete aggregates. There is today an automatic method, using computer technique and image analyses. With the 'PICAP' equipment from Linkoping University, the grain projections of length, width, surface perimeter and edge eveness are quickly determined, and many other functions derived from these. Controls have shown good reliability of the measured values. The measurement have been made on samples of natural sand as well as crushed materials of the fractions of the concrete sieve-series. Column diagrams have been made for median and quartile values of these fractions for comparison of samples. As may be expected, the natural glacifluvial sand in the fractions coarser than 0.125 mm has as a rule proved to have a higher axial equality and to have a more even surface than the crushed products. The difference between the latter is often small but details, of interest for the interpretation, have been noted. The present measuring system may, in certain circumstances, be recommended for testing of concrete aggregates and filler but also for testing in many other technologies.

PB81-117186 PC **A12**/MF **A01**
Cornell Univ., Ithaca, NY. Dept. of Structural Engineering.
Microcracking and Engineering Properties of High-Strength Concrete,
Ramon Luis Carrasquillo. Feb 80, 273p 80/1, NSF/RA-800238
Grant NSF-ENG78-05124

An X-ray technique was used to study internal microcracking. Two classification systems were developed to analyze the microcracks: bond-mortar crack analysis and simple-combined crack analysis. Internal microcracks were observed at four strain levels. The observed microcracking mechanism is related to the failure mode in uniaxial compression. The results of the mechanical properties study are presented including data on compressive strength, strength gain with age, specimen size effect, static modulus of elasticity, Poisson's ratio, modulus of rupture, tensile splitting strength, unit weight, and drying effect on compressive and flexural strength of normal- and high-strength concretes. A criterion for definition of failure in uniaxial compression for the concretes tested is presented. Failure is considered to occur at the discontinuity point defined as that point when a self-propagating microcracking mechanism is developed, eventually causing disruptive failure with time. The predicted stress and strain ratios at discontinuity are compared to those at which sudden changes occur in Poisson's ratio and volume change curves.

13D. Containers and Packaging

N80-74382/6 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
NASA Aerospace Pressure Vessel Safety Standard.
22 Feb 74, 13p NASA-TM-81074

The purpose of this safety standard is to provide criteria for utilizing fracture control techniques to design, fabricate, test, and operate aerospace pressure vessels so that associated personnel will be safe. Pressure vessels and systems covered by this standard cannot be designed, fabricated, or tested to meet the requirements specified by the ASME Boiler and Pressure Vessel code, Section VIII, Divisions 1 and 2, because they are lighter weight to meet flight use requirements. The operational requirements herein are applicable during development, testing, and operations on the ground and during flight.

PB81-113250 PC **A05**/MF **A01**
Bodenheimer (B.A.) and Co., Inc., Stamford, CT.
Container Technology Study. Volume I: Text.
Final rept. Jul 79-Feb 80,
Bert A. Bodenheimer. Oct 80, 89p DOT/TSC/RSPA-80-8-1
Contract DOT-TSC-1761-1
See also Volume 2, PB81-113268.

This report describes the results of an initial study to assess the technological and operational constraints on the development of a multimodal domestic freight container system. Under this program, the critical technological and operating constraints were identified, and the impact on shippers and operators was assessed. Key current investments in the freight transportation system were developed to evaluate the obsolescence of these investments due to the introduction of containers over a period of time. Also described are areas where further research is required to overcome the critical constraints identified during the study.

PB81-113268 PC **A05**/MF **A01**
Bodenheimer (B.A.) and Co., Inc., Stamford, CT.
Container Technology Study. Volume II: Appendixes.
Final rept. Jul 79-Feb 80,
Bert A. Bodenheimer. Oct 80, 82p DOT-TSC-RSPA-80-8-2
Contract DOT-TSC-1761-2
See also Volume 1, PB81-113250.

Volume II has nine appendixes as follows: Appendix A - Railroad Flatcar Data; Appendix B - Calculations; Appendix C - Record of Telephone Calls; Appendix D - Industry Interviews; Appendix E - Field Trips and Conferences; Appendix F - Annotated bibliography; Appendix G - Patents Reviewed; Appendix H - Literature Reviewed; and Appendix I - Report of New Technology.

13F. Ground Transportation Equipment

DOE/CS-0026/11 PC **A03**/MF **A01**
Department of Energy, Washington, DC. Office of Conservation and Solar Energy.
Electric and Hybrid Vehicle Program. Quarterly Report, April, May, June 1980.
Aug 80, 31p

Progress in the design, commercialization, performance, fuel economy, production and demonstration of electric vehicles and hybrid electric-powered vehicles is reported. (ERA citation 05:036876)

DOE/JPL/955189-T2 PC **A10**/MF **A01**
South Coast Technology, Inc., Santa Barbara, CA.
Preliminary Design Data Package. Appendices C1 and C3.
25 Jul 79, 217p
Contract NAS-7-100-955189

The computer programs, including HYBRID, VSYS, VEHIC and CRASH, used to compute the energy and fuel consumption, life-cycle costs and performance characteristics of a hybrid electric-powered vehicle are described and their use documented. (ERA citation 05:036883)

DOE/JPL/955189-T3 PC **A11**/MF **A01**
South Coast Technology, Inc., Santa Barbara, CA.
Preliminary Design Data Package. Appendix C.
25 Jul 79, 237p
Contract NAS-7-100-955189

The design requirements, design philosophy, method and assumptions, and preliminary computer-aided design of the Near-Term Hybrid Vehicle including its electric and heat power units, control equipment, transmission system, body, and overall vehicle characteristics are presented. (ERA citation 05:036884)

DOE/JPL/955189-T6 PC **A08**/MF **A01**
South Coast Technology, Inc., Santa Barbara, CA.
Phase I of the Near-Term Hybrid Vehicle Program. Final Report.
10 Sep 79, 154p
Contract NAS-7-100-955189

Heat engine/electric hybrid vehicles offer the potential of greatly reduced petroleum consumption, compared to conventional vehicles, without the disadvantages of limited performance and operating range associated with pure electric vehicles. This report documents a hybrid vehicle design approach which is aimed at the development of the technology required to achieve this potential, in such a way that it is transferable to the auto industry in the near term. The development of this design approach constituted Phase I of the Near-Term Hybrid Vehicle Program. The major tasks in this program were: mission analysis and performance specification studies; design tradeoff studies; and preliminary design. Detailed reports covering each of these tasks are included as appendices to

this report. A fourth task, sensitivity studies, is also included in the report on the design tradeoff studies. Because of the detail with which these appendices cover methodology and results, the body of this report has been prepared as a brief executive summary of the program activities and results, with appropriate references to the detailed material in the appendices. (ERA citation 05:036887)

DOE/JPL/955190-T1 PC **A05**/MF **A01**
General Electric Corporate Research and Development, Schanectady, NY.
Near-Term Hybrid Vehicle Program, Phase I. Appendix D. Sensitivity Analysis Report. Final Report.
8 Oct 79, 81p
Contract NAS-7-100-955190

The study methodology, the selection of input parameters and output variables, the sensitivity study results, and the conclusions of the sensitivity analysis for the Near-Term Hybrid Vehicle (NTHV) Program are presented. The objective of the Sensitivity Analysis was to determine the impact of variations in selected parameters on the utility, the economic attractiveness, and the marketability of the hybrid vehicle. The parameters to be varied include travel characteristics, energy costs, hybrid vehicle lifetime, maintenance costs, and fuel economy of the Reference ICE Vehicle. The results of the study are presented in terms of how the design variables affect each of these aspects of the NTHV. (ERA citation 05:036888)

DOE/NASA/0124-2 PC **A15**/MF **A01**
Eaton Corp., Southfield, MI. Engineering and Research Center.
Small Passenger Car Transmission Test: Ford C4 Transmission.
M. P. Bujold. Jun 80, 336p NASA-CR-159881
Contract AI01-77CS51044

The small passenger car transmission test was initiated to supply electric vehicle manufacturers with technical information regarding the performance of commercially available transmissions. This information would enable EV manufacturers to design a more energy efficient vehicle. With this information the manufacturers would be able to estimate vehicle driving range as well as speed and torque requirements for specific road load performance characteristics. This report covers the 1979 Ford C4 automatic transmission. This transmission was tested per a passenger car automatic transmission test code (SAE J651b) which required drive performance, coast performance, and no load test conditions. Under these test conditions the transmission attained maximum efficiencies in the mid-80% range for both drive performance tests and coast performance tests. The major results of this test are the torque speed and efficiency curves which are located in the data section of this report. These graphs map the complete performance characteristics for the Ford C4 transmission. This information will facilitate the vehicle manufacturer in the design of a more energy efficient vehicle. (ERA citation 05:036877)

DOE/NASA/0124-3 PC **A18**/MF **A01**
Eaton Corp., Southfield, MI. Engineering and Research Center.
Small Passenger Car Transmission Test: Chevrolet Luv Transmission.
M. P. Bujold. Jun 80, 415p NASA-CR-159882
Contract AT01-77CS51044

The small passenger car transmission test was initiated to supply electric vehicle manufacturers with technical information regarding the performance of commercially available transmissions. This information would enable EV manufacturers to design a more energy efficient vehicle. With this information the manufacturers would be able to estimate vehicle driving range as well as speed and torque requirements for specific roadload performance characteristics. This report covers the 1978 Chevrolet Luv Truck manual transmission. This transmission was tested per a passenger car automatic transmission test code (SAE J65lb) which required drive performance, coast performance, and no load test conditions. The portion of the test code which involved the throttle valve modulation and line pressure were deleted since they did not apply to the manual transmission. Under these test conditions the transmission attained maximum efficiencies in the upper 90% range at rated load for both drive performance tests and coast performance tests. The major results of this test are the torque speed and efficiency curves which are located in the data section of this report. These graphs map the complete performance characteristics for the Chevrolet Luv Truck Manual transmission. This information will facilitate the vehicle manufacturer in the design of a more energy efficient vehicle. (ERA citation 05:036878)

DOE/NASA/1011-32 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Laboratory Facility for Electric Vehicle Propulsion System Testing.
N. B. Sargent. 1980, 11p NASA-TM-81574, CONF-800939-1
Contract AI01-76CS51011
International congress on transportation, Dearborn, MI, USA, 15 Sep 1980.

The Road Load Simulator Facility located at the NASA Lewis Research Center in Cleveland, Ohio is described. This facility enables a propulsion system or any of its components to be evaluated under realistic vehicle inertia and road loads. The load is applied to the system under test according to the road load equation: F/sub net/ = K sub 1 F sub 1 + K sub 2 F sub 2 V + K sub 3 V exp 2 + K sub 4 (dv/dt) + K sub 5 sin theta. The coefficient of each term in the equation can be varied over a wide range with vehicle inertia representative of vehicles up to 7500 lb. simulated by means of flywheels. The required torque is applied by the flywheels, a hydroviscous absorber and clutch, and a drive motor integrated by a closed loop control system to produce a smooth, continuous load of up to 150 horsepower. (ERA citation 05:036879)

DOE-tr-234 PC **A02**/MF **A01**
Rectifier Electric Drive for an Electric Automobile Using a Non-Contact Synchronous Motor with Permanent Magnets.
V. G. Yapuk. 7p
A 2nd Soviet-American symposium on electric automobiles; Erevan, USSR, 1979.

A traction electric drive for an electric automobile (EA) using a rectifier electric drive (RED) is being developed due to the number of advantages which it has over other types of electric drives. The possibility for designing a compact engine reveals the promise for developing a motor-wheel of a multimotor modification which will make it possible to improve the flexibility of the control and the reliability of the drive of an electric automobile. The basic technical requirements determined by the specifics of designing and developing a motor are: high ratios of torque when accelerating and climbing, high efficiency in a wide rpm range and limited weight and size with minimal possibilities for cooling and rigid operating conditions. The use of high-energy permanent magnets made of rare-earth elements has made it possible to develop a motor which provides the required operating modes and performance at the required size. The design of a developed motor is discussed. (ERA citation 05:036882)

PAT-APPL-6-203 556 PC **A04**/MF **A01**
Department of Transportation, Washington, DC.
Digital Air Brake Control System.
Patent Application,
Cline W. Frasier. Filed 5 Nov 80, 51p PB81-116675, DOT/CASE-TSC-10141
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The invention generally concerns a microcomputer-operated air brake control system for controlling the air brakes of a railroad car. Such air brakes typically include a pneumatically operated brake cylinder pneumatically connected through appropriate valves to both an auxiliary air reservoir and an emergency air reservoir, both of which are in turn connected to a train air line which runs the length of the train.

PB81-111890 PC **A03**/MF **A01**
Dynamic Science, Inc., Phoenix, AZ.
Development of Compliance Test for Truck Rear Underride Protection. Volume I: Summary Report.
Final rept. Jun 78-Dec 79,
R. Baczynski, N. Johnson, and S. Davis. Sep 80, 50p 8319-80-020A/1607, DOT-HS-805 564
Contract DOT-HS-8-01905

The objective of this program was to develop static and dynamic compliance test procedures for truck/trailer rear underride protection. As a result of this program, a static test facility and dynamic test device along with appropriate compliance test procedures were developed to test and evaluate rigid and energy-absorbing velocity-sensitive underride guards. A truck body simulator was also developed to effectively model the rear of truck/trailer bodies for mounting of selected guards during testing. The dynamic test device is an energy-absorbing honeycomb-faced bogey vehicle which simulates the front load/deflection characteristics of a typical current large car. This report summarizes the highlights of the tests of current small and large car-to-current production guards, ten car-to-rigid guard tests to determine the effects of speed, guard heights, car size, and impact mode on underride and occupant response, and two tests of a production energy-absorbing guard. Based on the results of the crash tests and engineering analyses, recommendations are presented for underride guard requirements and compliance test procedures.

PB81-111924 PC **A14**/MF **A01**
Environmental Protection Agency, Ann Arbor, MI. Motor Vehicle Emission Lab.
Passenger Car Fuel Economy: EPA and Road. A Report to the Congress.
Final rept.,
Dillard Murrell. Sep 80, 306p EPA-460/3-80-010

In accordance with the National Energy Conservation Policy Act of 1978, Title IV, Part 1, section 404, this report has two objectives. (1) To determine the degree to which 'EPA MPG' figures used in fuel economy labels and gas mileage guides provide realistic estimates of average in-use fuel economy. (2) To provide a technical basis for revising, as necessary, the label and guide MPG figures to better agree with average in-use fuel economy, and, further, to provide information on the degree to which specific in-use fuel economy influences can cause departures from the standardized label and guide fuel economy figures.

PB81-116105 PC **A10**/MF **A01**
Novatek, Inc., Burlington, MA.
Design, Fabrication and Evaluation of Prototype Wayside Brake Inspection Sensors.
Final rept. Dec 77-Aug 78,
David B. Spaulding, Kendrick W. Lentz, Jr., Gilbert G. Fryklund, and John R. Gillespie. Jun 80, 205p DOT-TSC-FRA-80-8, FRA/ORD-80/20
Contract DOT-TSC-1323

Prototype Wayside instrumentation has been designed, developed, and tested that proves the feasibility of measuring braking system effectiveness on moving rail cars. The instrumentation system includes a specially designed short section of instrumented rail and two infrared detectors. The rail section deflects elastically under each passing wheel load, and two orthogonally placed transducers discriminate between rail reaction to braking and to weight. A pair of infrared detectors viewing the rims on both wheels of each axle provide thermal data useful in determining the side to side ratio of total axle braking effort. Together these sensors can generate data to evaluate the braking performance of each wheel. Field tests to evaluate the system were conducted on a commercial rail line and at the U.S. Department of Transportation's Transportation Test Center at Pueblo, CO. Test results showed that the sensors were able to indicate normal and abnormal braking conditions. Also included in the report are a railcar brake system fault and malfunction analysis, structural analysis of the instrumented rail, design analysis of the infrared sensor, detail specifications of the rail and infrared sensors, and recommendations for further system development and testing.

PB81-117988 PC **A09**/MF **A01**
Electromagnetic Compatibility Analysis Center, Annapolis, MD.

Railroad Electromagnetic Compatibility. Locomotive Volume 1, Summary of E-60 CP Electromagnetic Emission Yard Measurements.
Interim rept.,
Daniel J. O'Neill. Oct 80, 182p ECAC-CR-80-027, FRA/ORD-80/066.I
Prepared in cooperation with IIT Research Inst., Chicago, IL. See also report dated Mar 78, PB-281 705.

Results of electromagnetic emission measurements performed on E-60 locomotives at AMTRAK's Wilmington, Delaware, Maintenance facility are presented. A description of the measurements and methodology employed is included.

PB81-119398 PC **A02**/MF **A01**
Environmental Protection Agency, Ann Arbor, MI. Technology Assessment and Evaluation Branch.
Exhaust Emissions from a Ford Pinto Equipped with the General Dynamics Electrosonic Control System.
Technical rept.
Oct 76, 18p EPA-AA-TAEB-77-02

The EPA receives information about many systems which appear to offer potential for emission reduction or fuel economy improvement compared to conventional engines and vehicles. One such system has been developed jointly by General Dynamics and Autotronic Controls Corporation. This system is called the Electronic engine Control System (Electrosonic), and utilizes the principles of lean-burn combustion to control exhaust emissions. The Electrosonic system is designed to control engine parameters affecting exhaust emissions. As such, the system controls ignition timing, air-fuel ratio and idle speed. The system does have EGR control capability, although EGR was not on the 1976 Ford Pinto MPG supplied to the EPA for evaluation.

PB81-120107 PC **A06**/MF **A01**
Calspan Advanced Technology Center, Buffalo, NY.
Performance Evaluation of the SA103C Three-Year Old Child Test Dummies with Substitute Flesh Parts and in Various Restraint Seats.
Final rept. Jun-Nov 79,
Kenneth N. Naab. Aug 80, 113p CALSPAN-6385-V-2, DOT-HS-805 562
Contract DOT-HS-8-02022

The objective of the research effort was to determine whether there are differences in calibration performance or simulated crash test performance of SA103C three-year old child test dummies when they were tested with flesh parts produced with Nitrosan as compared to flesh parts made with OBSH/TBPP foaming compound. Dummies with the OBSH/TBPP flesh parts were tested in this program and the resulting sled test performance data compared statistically to data from previous tests. A series of 21 dummy performance tests was conducted on a HYGE accelerator sled at 30 MPH with each of two dummies tested in a sequence of three replicate runs in a GM Love seat, a Chrysler Mopar and a Ford Tot-Guard safety seat. The primary measures of dummy performance analyzed with the statistical methods are: (1) peak head resultant acceleration; (2) peak chest resultant acceleration; (3) maximum head C.G. displacement; and (4) maximum knee displacement. An analysis of the absolute deviations of each data point from a population mean has demonstrated that the dummy variations are within an acceptable level for all performance measures.

PB81-121428 PC **A10**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Dept. of Urban Studies and Planning.
A Detailed Methodology for Railroad Costs.
Rept. no. 24,
James R. Gallagher, Karen R. DeVol, and William H. Crown. Jun 80, 217p EDA-ERD-80-166
Grants EDA-OER-554-G-79-5, EDA-99-7-13351.4
Sponsored in part by Federal Railroad Administration, Washington, DC.

Expenditures by the railroad industry are estimated using the Multi-regional Input-Output Model (MRIO) format, thus making them useful for the study of changes in regional prices and quantity demanded. In order to be consistent with the national input-output table that has been constructed by the Bureau of Economic Analysis, the railroad estimates are made for the calendar year 1972. A detailed description of the methodology used in making these estimates is presented in this report. This is followed by a brief analysis of the interregional differences in railroad expenditures.

UCID-18754 PC **A06**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
System for Acquisition and Reduction of Demonstration Data for Electric and Hybrid Vehicles.
E. H. Lorbeer, and C. E. Walter. 24 Jul 80, 116p
Contract W-7405-ENG-48

Congress seeks to reduce petroleum consumption by encouraging the use of electric vehicles and has legislated an Electric and Hybrid Vehicle Demonstration project. In carrying out this mandate, DOE developed a data plan to assess the Demonstration project. The Data Aquisition and Reduction Module (DARM) System was developed by LLNL for use on demonstration electric vehicles to determine reliably and inexpensively quantitative data on their performance. The DARM System consists of an instrumentation unit which is installed in selected demonstration vehicles, a tape reader, and data reduction programs. Once the onboard DARM unit is installed, the vehicle operator needs only to insert and remove cassette tapes at intervals of up to three months. The tapes can be reduced with the specialized reduction programs, entered into a data base, and the data subjected to analysis at a Data Reduction Center. DARM povides data on energy consumption (into and out of the battery), distance and time travelled, and number of stops experiences. A profile of energy consumption and time spent as a function of speed and acceleration allows deduction of driver satisfaction and provides direction to designers for improving electric vehicle performance. (ERA citation 05:036880)

UCRL-15280 PC **A10**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Flywheel Energy Storage Unit Technology Development Program.
20 Jun 80, 212p
Contract W-7405-ENG-48

A program to demonstrate an improved flywheel energy storage unit (ESU) to be used in combination with a heat engine for propelling a 1985 family sedan is described. Information is included on flywheel ESU design criteria, design, stress analysis thermal analysis, and performance. The ESU was designed, fabricated, and partially evaluated prior to the program being discontinued by LLL because of electrical machine failures and insufficient funds to correct the hardware discrepancies. (ERA citation 05:036890)

13G. Hydraulic and Pneumatic Equipment

N81-10809/4 PC **A05**/MF **A01**
Oxford Univ. (England). Dept. of Engineering Science.
The Underwater Jet Noise Rig: A Working Report 1978 to 1979.
R. E. Franklin, and J. Mcmillan. Mar 80, 78p OUEL-1310/80
Contract ERC/9/4/2057/70

An underwater jet rig was developed and experiments run showing that it can be used successfully to study a wide range of problems. Extraneous low and middle frequency noise which was found to have been transmitted by vibrations of the inlet pipework to the nozzle and has been virtually eliminated by modifications to the rig. The rig can provide accurate and highly repeatable interference-free noise spectra for water jets up to 2 in. dia. and jet speeds up to 67 ft sec, and experiments with jets of three different diameters show that the spectra are consistent with those published by other workers for single phase jets. The high frequency levels of the jet noise spectra, even at high cavitation numbers, are shown to be highly sensitive to the concentration of micro bubbles of air in the water flow. There is evidence that the bubbles may give rise to interference by vibration noise. With small diameter jets, sustained running of the rig can be achieved at very low concentrations of micro bubbles with negligible background noise throughout the frequency range of measurement, 20 Hz to 40 KHz.

13H. Industrial Processes

AD-A090 841/8 PC **A02**/MF **A01**
Stanford Univ., CA. Dept. of Mechanical Engineering.
The Analysis of Metal-Forming Processes.
Final rept. 25 Apr 77-24 Apr 80,
E. H. Lee, and R. L. Mallett. 11 Oct 80, 9p ARO-14617.3-E
Grant DAAG29-77-G-0126

A complete stress and deformation analysis of metal-forming process is necessary in order to assess the onset of metal-forming defects such as the initiation of cracks, the generation of high residual stresses or the occurrence of local flow abnormalities. Rigid-plastic theory can only predict stresses in the regions exhibiting significant current plastic flow so that to evaluate stresses throughout the material it is necessary to carry out an elastic-plastic analysis. A finite-element computer program to evaluate complete stress and deformation distributions has been developed and applied, bringing new insights to the assessment of metal-forming processes. The plastic part of an elastic-plastic deformation is that remaining when the stress, and hence the elastic strain, is reduced to zero. Elastic deformation is that produced in this purely plastically deformed material by the action of stresses up to yield. The associated exact finite-deformation kinematics shows the almost universal assumption that the total rate of deformation is the sum of elastic and plastic rates to be in error. An incremental elastic-plastic theory is developed using the nonlinear kinematics. The theory is contrasted with that in common use and anomalies in the latter are discussed. (Author)

AD-A090 897/0 PC **A04**/MF **A01**
Army Industrial Base Engineering Activity, Rock Island, IL.
Manufacturing Methods and Technology, CAM Related Projects, FY 80-82.
Final rept.,
James H. Sullivan. Aug 80, 51p

This report provides a summary of the Army's FY 80-82 Manufacturing Methods and Technology Program directed toward computer-aided manufacturing. The following information is provided for 73 projects. Project number, title, projected funding, a statement of the problem and proposed solution, and the technology thrust area into which the project is categorized. The current status of FY80 projects is also provided. (Author)

BDX-613-2418 PC **A03**/MF **A01**
Bendix Corp., Kansas City, MO.
Deburring Small Intersecting Holes.
L. K. Gillespie. Aug 80, 49p
Contract AC04-76DP00613

Deburring intersecting holes is one of the most difficult deburring tasks faced by many industries. Only 14 of the 37 major deburring processes are applicable to most intersecting hole applications. Only five of these are normally applicable to small or miniature holes. Basic process capabilities and techniques used as a function of hole sizes and intersection depths are summarized. (ERA citation 05:037041)

PB81-119653 PC **A05**/MF **A01**
Massachusetts Univ., Amherst. Dept. of Mechanical Engineering.
An Interactive Digital Computer Program to Encode and Analyze the Manual Assembly of Small Parts (Design for Manufacturability.)
Rept. no. 7,
R. P. Field, and G. A. Russell. Feb 80, 89p NSF/RA-800251

Grant NSF/APR77-10197

The Assembly Process Analysis Program (APAP) is a computer software package developed to evaluate a small parts computer design in terms of the manual assembly process. The system consists of a Digital Equipment Corporation PDP-11/34 minicomputer that is programmed to analyze the assembly process (handling, mating, assembly) of a wide class of hand-assembled products. Two coding schemes are presented which describe small part shape. The UMASS manual assembly process code is described and a sample assembly process is coded. The developed computer program is described and the logic flow and presentation to the user are discussed. Programming practices are considered with respect to Fortran, graphics, displays, and memory management techniques. Results are presented of three assembly processes subjected to the computer program. Actual assembly lines are compared to programgenerated times, and differences and similarities are discussed. Recommendations are offered to enhance the computer program. Extensive appendices cover coding, data, files, and system subroutines and descriptions.

13I. Machinery and Tools

AD-B026 330/1 PC **A04**/MF **A01**
Amron Corp., Waukesha, WI.
Development of a 30mm Frangible Projectile Crimper.
Final rept. Jun 76-Jan 77,
Roy E. Rayle. Feb 77, 64p AFATL-TR-77-21
Contract F08635-76-C-0262
Distribution limitation now removed.

The hydraulic crimping method used to assemble GAU-8/A (30mm) ammunition has been found unsuited for use with two projectile designs under development by AFATL. One of these, a plastic jacketed washer stack frangible target practice projectile, was chosen as the design-limiting case for the development of an alternative crimping method. A crimper designed to roll crimp plastic frangible projectiles into standard aluminum GAU-8 cartridge cases in such a manner that adequate projectile retention force is developed without structural damage to either the projectile or the cartridge case has been developed. The crimper consists of a cartridge holder mounted on a table under a rotary crimp head containing three pneumatically actuated crimp roller arms. Compressed air is metered into the air cylinder for gradual buildup of crimping force. On reaching a predetermined pressure, air in the cylinder is exhausted and the revolving crimp arms return to their original position. Two identical prototype crimping machines were fabricated to this design and ammunition assembled with them subjected to both static debulleting tests and Mann barrel firing tests. All design goals were met. Both prototypes include an air compressor to actuate pneumatic components, interlocked safety shields, and explosion-proof electrical components adequate for use in a laboratory ammunition loading environment. (Author)

PATENT-4 214 905 Not available NTIS
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Method of Making Bearing Material.
Patent,
H. E. Sliney. Filed 31 Jan 77, patented 29 Jul 80, 7p N80-33482/4, PAT-APPL-764 245
Supersedes PAT-APPL-764 245-77, N77-32249 (15 - 23, p 3050).
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

A composite material is described which will provide low friction surfaces for materials in rolling or sliding contact and is self lubricating and oxidation resistant up to and in excess of about 930 C. The composite is comprised of a metal component which lends strength and elasticity to the structure, a fluoride salt component which provides lubrication and, lastly, a glass component which not only provides oxidation protection to the metal but may also enhance the lubrication qualities of the composite.

PB81-115016 PC **A10**/MF **A01**
Arbeitsgemeinschaft Handabungssysteme, Stuttgart (Germany, F.R.).
Neue Handhabungssysteme als Technische Hilfen fuer den Arbeitsprozess. Teil 4: Antriebe fuer Handhabungssysteme (New Handling Systems as Technical Support for the Working Process. Part 4. Drives for Handling Systems),
Peter Drexel, Erich Schmalenbach, Gerd Wauer, Reinhard Haas, and Manfred Schweizer. Jul 80, 217p BMFT-FB-HA-80-030
Also pub. as ISSN-0171-7618. Text in German, abstract in English.

Social, technical and economic reasons require an enhanced application of handling systems such as industrial robots. As quality and efficiency of an industrial robot depend greatly on its drives, the ARGE HHS within its project Neue Handhabungssysteme als technische Hilfen fur den Arbeitsprozeb (New Handling Systems as a Technical Aid in the Working Process) intend to analyze all the drive systems possible with industrial robots, and to develop, improve and adapt those types of drives that are likely to be most suitable for advanced applications. Work on this project includes theoretical and experimental research as well as constructions, manufacturing, assembly and final tests. The aim of this work is to offer drives of different characteristics using different forms of energy to cover the needs of a large variety of applications in industrial handling systems.

PB81-115024 PC **A05**/MF **A01**
Gebrueder FELSS, Koenigsbach-Stein (Germany, F.R.).
Entwicklung einer Typenreihe programmierbarer Manipulatoren mit flexiblen Steuergeraeten und peripheren Einrichtungen (Development of Series of Programming Industrial Robots, Flexible Control Units as Well as Periphery Elements),
Klaus Kienhoefer. Jul 80, 81p BMFT-FB-HA-80-028
Also pub. as ISSN-0171-7618. Text in German, abstract in English.

Aim of this object was the development of a series of three small industrial robots for pick and place workpieces with weights of 0,25 kp, o,75 kp and 1,5 kp. The units have been composed as modular systems and can thus be easily adapted to specific handling problems. All movements are effected by means of pneumatic cylinders and sequences can be realized by PLC or relay controls. These controls as well as a lot of periphery elements like supports, brackets, sliding and stroke tables, have also been developed during this project. All units have been tested with regard to reliability and durability under production conditions. All obtained return experiences and practical knowledge have served to improve technical details, so that now a practical and marketable program of such units is available.

PB81-115586 PC **A07**/MF **A01**
Arbeitsgemeinschaft Handabungssysteme, Stuttgart (Germany, F.R.).
Neue Handhabungssysteme als Technische Hilfen fuer den Arbeitsprozess. Teil 8: Pruefstand fuer Industrieroboter (New Handling Systems as Technical Support for the Working Process. Part 8. Test Stand for Industrial Robots),
Bernd Brodbeck, and Guenter Schiele. Jul 80, 131p BMFT-FB-HA-80-032
Also pub. as ISSN-0171-7618. Text in German, abstract in English.

In the field of industrial robots, there are no general guidelines for the standardisation of machine characteristic. In order to compare data from various devices, these machine characteristics have ascertained with the same parameters. Therefore a test program and various measuring methods were developed. On the base of this test program, about 25 devices were measured at the test-stand. They differed with regard to kinematic, drive, and control. Based on these measurements suggestions for a rule of purchase for handling-devices were worked out.

PB81-122517 PC **A04**/MF **A01**
Purdue Univ., Lafayette, IN. School of Electrical Engineering.
Advanced Industrial Robot Control Systems.
Rept. no. 5, 1 Jul 79-1 Jan 80,
R. Paul, J. Luh, S. Y. Nof, D. Brandin, and H. Lechtman. Jul 80, 54p TR-EE80-30, NSF/RA-800228
Grant NSF-APR77-14533
See also report dated Jul 79, PB80-106396.

Robot and human operator capabilities in performing industrial tasks are analyzed and a work methodology developed for industrial robots. A new system of standard elementary robot motion and Reach Task Motion (RTM) Tables were developed which specify estimated Stanford Arm time requirements to perform individual motions. Robot and human task performance methods were compared using a water pump assembly. Differences observed were due to the robot's lack of finger dexterity, limited input sensing capability relative to human senses, and the use of only one arm. These limitations can be overcome by proper methods, placing, and workplace design. Robot performance required over eight times the estimated human performance time. Results indicate that RTM may provide a useful methodology in the analysis and design of robot work. Another important result is the transformation from a given human-performed industrial task to a robot-performed industrial task. RTM elements also provide a method for evaluating different robots.

PB81-800476 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Design and Applications of Flywheels. September, 1978-October, 1980 (Citations from the NTIS Data Base).
Rept. for Sep 78-Oct 80,
Guy E. Habercom, Jr. Nov 80, 173p
Supersedes PB80-800311, and NTIS/PS-78/0997. See also 1964-August, 1978, NTIS/PS-79/1081.

The design and varied applications of flywheels and reaction wheels are investigated in these Government-sponsored research reports. Such diversified applications as satellite stabilization, surface vehicle propulsion, energy transfer devices, and inertia or friction welding are reviewed. (This updated bibliography contains 166 citations, 73 of which are new entries to the previous edition.)

13J. Marine Engineering

AD-A090 833/5 PC **A07**/MF **A01**
Rexnord Inc Milwaukee WI Environmental Research Center
Feasibility Study of a Barge Mounted System for Treatment of Sewage from Army Watercraft Holding Tank.
Final rept.,
Thomas Dupuis, J. R. Meverden, and Gary Rollinger. Oct 80, 141p
Contract DAAK70-79-C-0078

The objective of this study was to determine the technical feasibility of using a barge mounted treatment system for handling blackwater wastes from U.S. Army watercraft. This would replace the current practice of pumping out the blackwater storage tanks on watercraft into tank trucks and transporting the materials to a sewage treatment plant. In order to develop a barge mounted blackwater treatment system a body of information was gathered and analyzed. Initially an extensive literature search was conducted to determine the state-of-the-art in marine waste treatment. This included shipboard waste characterization (in terms of quantity and pollutant concentrations) and investigation of applicable legislation. Commercial and developmental marine sanitation devices (MSD's) were studied, as well as conventional wastewater treatment methodologies which appeared feasible for barge mounting. Specific design requirements involved in barge mounting of a treatment system were also identified. Based on this information, feasible barge locations and specific design wasteloads were determined. Once the nature and

quantity of the waste and basic design requirements were established, a preliminary screening of the spectrum of wastewater treatment unit processes was conducted to isolate a number of pertinent alternative systems. Suitability of these systems was based on capability to meet discharge requirements, adaptability to barge mounting and operational simplicity. These systems were then compared at each location from a cost and technical standpoint and the most feasible system(s) determined.

AD-A090 944/0 PC **A02**/MF **A01**
Naval Research Lab., Washington, DC.
United States Frigate Constellation: Monitoring of Water at Constellation Pier, Baltimore Harbor, for the Presence of Marine Wood-Destroyers--First Year of Observations, from April 1978 to May 1979.
Interim rept.,
John D. Bultman, Kathleen K. Parrish, and Carmela A. Bailey. 30 Sep 80, 11p Rept no. NRL-8455

The United States Frigate Constellation is permanently berthed at Constellation Pier in Baltimore Harbor. Recently, an extensive program of repair and restoration was begun and a schedule of preventive maintenance established. Because the hull and other wooden structures of Constellation are susceptible to degradation by wood-destroying organisms, the preventive maintenance program includes the monitoring of the water adjacent to the hull of the presence of marine wood-destroyers and inspection of internal wooden structures for fungal degradation. Environmental and biological data were obtained from three field inspections performed since the monitoring program began. The biological data show that there is no marine-borer (Bankia gouldi) activity in the water at Constellation Pier, and unless there occurs an unusual and prolonged change in climatic conditions which would increase the salinity of the water, a future infestation of B. gouldi is not likely. Consequently, there is no current threat to the hull of Constellation by this borer, and no action is now required to protect the hull of Constellation from borer attack. Currently, the most serious threat to the hull is the presence of lignicolous fungi on the wood at and below the waterline. Fungal damage, if any, can be determined when Constellation is moved into drydock for hull inspection and maintenance. (Author)

AD-A091 126/3 PC **A05**/MF **A01**
MAR, Inc., Rockville, MD.
An Evaluation of the Hydrodynamic Stability and Operational Suitability of a Towed CTD Depressor System through Use of an Acoustic Tracking Range.
Technical rept.,
Thomas H. Hesselbacher, and George J. Ranes. Sep 80, 99p Rept no. MAR-TR-251
Contract N00014-79-C-0803

In September 1979, MAR, Incorporated was contracted to perform an acoustic tracking test of a depressor designed to house a CTD instrumentation package. This report describes the planning, preparation and results of the test conducted at the BARSTUR range in June 1980. The depressor is a modified mine sweeping body employing an inertially actuated rudder for lateral stability and a closed loop servo-control system for depth and elevator control. A sketch showing the principal dimensions of the body is presented. The depressor can be operated either at constant, commandable depth or can be commanded to cycle up and down about a mean depth by inputting a wave form signal through the control system. Although the depressor was designed and demonstrated to be very stable during tow-basin tests, an at-sea demonstration was felt to be necessary to determine the spatial and temporal scales of stability when the system was subject to the perturbating influence of sea state, operational towcable lengths and the inclusion of the remote sensors.

AD-A091 153/7 PC **A10**/MF **A01**
Southwest Research Inst., San Antonio, TX.
Evaluation of Liquid Dynamic Loads in Slack LNG Cargo Tanks.
Final rept.,
P. A. Cox, E. B. Bowles, and R. L. Bass. May 80, 201p SWRI-SR-1251, SSC-297
Contract DOT-CG-71374-A

This report provides an evaluation of dynamic sloshing loads in slack LNG cargo tanks. A comprehensive review of worldwide scale model sloshing data is presented. The data are reduced to a common format for the purposes of defining design load coefficients. LNG tank structural details are reviewed with emphasis placed on defining unique design features which must be considered in designing LNG tanks to withstand dynamic sloshing loads. Additional scale model laboratory experiments are conducted to supplement the available model sloshing data. Experiments are conducted in combined degrees of freedom to establish the potential for multi-degree of freedom excitation for augmenting dynamic sloshing loads. Experiments are also conducted to establish the sloshing dynamic pressure-time histories which are necessary for structural response analysis. Experiments are also conducted on representative segments of a full-scale LNG ship tank structure which is loaded with a typical full-scale dynamic sloshing pressure as predicted from the model results. Analytical studies are undertaken to provide techniques for determining wall structural response to dynamic slosh loads. Finally, design methodology is presented for membrane and semi-membrane tanks, gravity tanks, and pressure tanks whereby the design procedures sequences from comparing resonant sloshing periods to ship periods, defining the design loads, and designing the tank structures affected by dynamic slosh loads by delineated procedures which vary with tank type. (Author)

AD-A091 154/5 PC **A05**/MF **A01**
Mansour Engineering, Inc., Berkeley, CA.
Ultimate Strength of a Ship's Hull Girder in Plastic and Buckling Modes.
Final rept.,
A. E. Mansour, and A. Thayamballi. Jun 80, 79p SSC-299
Contract DOT-CG-74755-A

Knowledge of the limiting conditions beyond which a ship's hull girder will fail to perform its function is important in assessing accurately the true margin of safety in the design of ships. Such information is essential also for developing design procedures, requirements, and rules which achieve uniform standards among vessels of different sizes and types. In this report, these limiting conditions were analyzed with the objective of determining the ultimate strength of a hull girder. The ship was considered to be subjected to a realistic loading consisting of vertical and lateral bending moments and torsional moment. Buckling and instability of the hull stiffened plates, the fully plastic yield moments, and the shakedown moments were further developed in a procedure for estimating the ultimate capacity of the hull. New interaction relations for the ultimate strength of ships subjected to combined moments were developed in this study. The fracture (fatigue and brittle) modes of failure were not included. An application to a 200,000 ton displacement tanker was carried out to show the details of the procedure and to examine the effects of various factors on the ultimate capacity of the hull. Lack of adequate formulations in certain areas were pointed out particularly when the collapse mode involved coupling between several mechanisms of failure. Analytical studies as well as a two-part test program were recommended with their objectives outlined. (Author)

AD-B020 519/5 PC **A02**/MF **A01**
Center for Naval Analyses Arlington VA Systems Evaluation Group
Alternate CV Flight Deck Arrangements.
Peter L. Willson, Robert W. Covey, and Thomas F. Donnelly. May 77, 16p Rept no. CRC-332
Contract N00014-76-C-0001
Distribution limitation now removed.

No abstract available.

GKSS-79/E/33 PC **A02**/MF **A01**
Gesellschaft fuer Kernenergieverwertung in Schiffbau und Schiffahrt m.b.H., Geesthacht-Tesperhude (Germany, F.R.).
Investigation of Inherent Ship Hull Vibrations Using a Digital Signal Analyser.
G. Witte. Dec 79, 4p
In German.
U.S. Sales Only.

Using an up-to-date digital analyzer the overall resonant hull vibrations of the NS 'Otto Hahn' were determined. This device gives the possibility of recording the vertical and horizontal bending vibration as well as the torsional vibrations in a very quick and effective manner. In addition to the natural frequencies the vibrational modes, the excitation of vibrations due to the propeller and to slamming forces, and the influence of shallow water were also measured. (Atomindex citation 11:514438)

GKSS-79/E/36 PC **A04**/MF **A01**
Gesellschaft fuer Kernenergieverwertung in Schiffbau und Schiffahrt m.b.H., Geesthacht-Tesperhude (Germany, F.R.). Inst. fuer Anlagentechnik.
2ND Reactor Core of the NS Otto Hahn. Design, Operation Experience, Developments.
H. J. Manthey, and H. Kracht. 1979, 53p
In German.
U.S. Sales Only.

Details of the design of the 2nd reactor core are given, followed by a brief report summarising the operating experience gained with this 2nd core, as well as by an evaluation of measured data and statements concerning the usefulness of the knowledge gained for the development of future reactor cores. Quite a number of these data have been used to improve the concept and thus the specifications for the fuel elements of the 3rd core of the reactor of the NS Otto Hahn. (Atomindex citation 11:514437)

13K. Pumps, Filters, Pipes, Fittings, Tubing and Valves

AD-A091 052/1 PC **A03**/MF **A01**
Coast Guard Research and Development Center, Groton, CT.
Hazardous Chemical Pump Tests.
Final rept.,
Steven J. Rosenberg, and Roger F. Christensen. 1 Jul 80, 43p CGR/DC-4/80, USCG-D-57-80

Three hydraulically powered submersible centrifugal pumps, the Framo TK-4, Framo TK-5 and Thune Eureka 150, were tested to document their performance in pumping viscous liquids. The tests were performed using an ADAPTS 40 HP prime mover or a NAVSEA 80 HP prime mover under controlled viscosity (temperature) and discharge pressure to simulate the various hazardous chemicals and long discharge lines expected during the offloading of stricken vessels. All three pumps performed adequately under the test conditions. In particular, the Framo TK-5 can provide a greater discharge flow rate than the Framo TK-4 under the same test conditions. The Framo TK-5 performed well with the ADAPTS prime mover. Both the Framo TK-5 and the Thune-Eureka 150 pumps performed well with the NAVSEA prime mover. The NAVSEA prime mover has the capability to operate two Framo TK-5 pumps simultaneously. The results will be used to help in preparing procurement specifications for a Coast Guard hazardous chemical pumping system. (Author)

N81-10333/5 PC **A02**/MF **A01**
von Karman Inst. for Fluid Dynamics, Rhode-Saint-Genese (Belgium).
Radial Pump Impeller Measurements Using a Laser Doppler Velocimeter.
H. Kannemans. Sep 79, 10p VKI-PREPRINT-1979-17
Submitted for Publication. Presented at Asme Gas Turbine Conf. And Products Show, New Orleans, 9-13 Mar. 1980.

A shrouded fully transparent radial pump impeller with thin backswept blades was tested using a laser Doppler velocimeter. Two components of the velocity were measured relative to the laboratory reference frame in a plane perpendicular to the axis of rotation. The velocity distribution is presented relative to the blades at different radii and different flow rates over the whole blade passage. Results show that the flow is essentially unsteady and, at low flow rate, highly influenced by viscous

effects. A comparison between the experimental data and a potential flow theory shows good agreement at high flow rates.

N81-10337/6 PC **A02**/MF **A01**
von Karman Inst. for Fluid Dynamics, Rhode-Saint-Genese (Belgium).
On the Prediction of the Reverse Flow Onset at the Centrifugal Pump Inlet.
B. Schiavello, and M. Sen. 1980, 14p VKI-PREPRINT-1980-6, TN-81
Submitted for Publication. Presented at Asme Symp. On Performance Prediction of Centrifugal Pumps and Compressors, New Orleans, 1980.

Several models of centrifugal pump impellers were designed and tested in order to find design criteria for minimum reverse flow capacity and wide pump operating range. Aerodynamic pressure field, meridional flow diffusion and secondary flows were assumed as prevailing factors on flow separation and reverse flow onset in impellers of low specific speed centrifugal pumps. Overall and detailed time steady measurements at the impeller inlet and exit are discussed. Analysis of the results shows that the delay of the flow separation reverse flow prerotation phenomena, which are occurring in sequence, is strictly linked to the relative flow diffusion in the impeller tip streamtube and to the blade spanwise aerodynamic loading distribution. Some criteria for predicting the reverse flow onset are presented.

N81-10437/4 PC **A02**/MF **A01**
von Karman Inst. for Fluid Dynamics, Rhode-Saint-Genese (Belgium).
Inlet Flow in Centrifugal Pumps at Partial Deliveries.
M. Sen. Jun 79, 9p VKI-PREPRINT-1979-16
In French; English Summary. Submitted for Publication. Presented at Soc. Hydrotech. De France Session 113 on Comportement Dyn. Des Turbomachines Hydrauliques, 20-21 Jun. 1979.

Pump design parameters influencing swirling reverse flow were investigated. Several impellers were developed and tests were performed to investigate inlet flow characteristics. An important parameter is called the Pump's Critical Delivery which corresponds to the onset of swirling reverse flow at the tip of the blade's leading edge. The results showed uniform aerodynamic hub to tip blade loading to be the most important criterion associated with low critical deliveries. High critical deliveries are obtained with a high aerodynamic blade loading at the tip. Head stability is not related to swirling reversed flow. A relation does, however, exist between shaft power and reverse flow.

PB81-120404 PC **A03**/MF **A01**
Weidlinger Associates, New York.
Dispersion Relations of an Elastic Rod Embedded in an Elastic Soil.
R. Parnes. Feb 80, 29p 16, NSF/RA-800211
Grant NSF-PFR78-15049

Failure of buried pipes during earthquakes is believed to be due to resonant or near-resonant behavior under certain prescribed ground motion inputs. For any given wavelength, the resonant frequencies of the system are immediately known once the phase velocities of the system are established. These phase velocities are dependent on the wavelengths of waves propagating in the system and thus reveal the dispersive character of the system. The model considered is represented by an elastic rod of radius 'a' embedded in a linear elastic medium, and the interaction between the surrounding soil and pipe is assumed to occur through a shear mechanism acting at the interface. The problem is then to consider at what velocities a wave of wavelength lambda can propagate under steady state conditions. Results are presented in the form of dispersion curves and surfaces. From a study of the analytical results obtained, lower and upper bounds on the phase velocities are established.

13L. Safety Engineering

AD-A091 054/7 PC **A05**/MF **A01**
Naval Postgraduate School, Monterey, CA.
An Analysis of Accidents Involving Towboat-Barge Combinations on Selected Inland Waterways of the United States.
Master's thesis,
William John Gamble. Jun 80, 90p

This study uses a statistical analysis approach on a computerized data base to analyze accidents involving towboat-barge combinations on the inland waterways of the United States. The main areas explored are the factors affecting the severity and the frequency of accidents. In addition, multiple regression models are used to predict the severity of towboat accidents from a set of independent accident variables. Conclusions and recommendations are given on towboat accidents and on marine accident data collection and analysis. (Author)

AD-A091 155/2 PC **A12**/MF **A01**
Federal Aviation Administration Washington DC Airports Service
Airport Crash/Fire/Rescue (CFR) Service Cost and Benefit Analysis. Volume II. Appendixes.
Jul 80, 267p Rept no. FAA-AS-80-2-VOL-2
See also Volume 1, AD-A090 726.

Contents: National CFR Equipment Inventory; The 221 AIR Carrier Accidents with Potential CFR Benefits Selected in Pass One; The 129 AIR Carrier Accidents that Pass Two Determined to Provide No CFR Benefits; A List of The 61 Air Carrier Accidents Studied in Detail in Pass Three for Which NTSB Records were Available; The 31 Air Carrier Accidents for Which Detailed NTSB were Unavailable; Description of The 61 Air Carrier Accidents Studied in Detail in Pass Three for Which NTSB Records were Available; and Estimates of CRF Crash Benefits for Air Carrier Accident, 1966-1978.

AD-A091 245/1 PC **A02**/MF **A01**
Army Armament Research and Development Command, Aberdeen Proving Ground, MD. Ballistics Research Lab.
Pressure Regulation in a Reduced Pressure Chamber Using a Cryogenic Temperature Controller.
Memorandum rept.,
Mark A. Dewilde. Aug 80, 20p ARBRL-MR-03056, AD-E430 519

A cryogenic temperature controller, invented at the University of Virginia, is adapted for use as a pressure regulator in a reduced pressure flame studies system. Designed for use in a dynamic flow system, the regulator will hold a pressure within worst limits of 5 mm Hg throughout a flow range of 0.1 lpm to lpm, in a pressure range of 2 to 760 mm.

SGAE-3054 PC **A02**/MF **A01**
Oesterreichische Studiengesellschaft fuer Atomenergie G.m.b.H., Vienna.
Personnel Security Circuit Including a Microprocessor.
G. Stehno. Sep 79, 13p IA-88/79
In German.
U.S. Sales Only.

Before starting up an irradiation installation the operator has to check that there are no persons in the area under irradiation and that the door is closed. This state is held verified by a personnel security circuit. There are a double start switch, two double interrupt switches as well as a display board installed in this irradiation chamber. Outside two further display boards, the central switch board, a horn and a separate warning light are mounted in appropriate positions. All display boards show the states "Attention" and "Ready", those outside show in addition the state "In Operation". (Atomindex citation 11:514521)

13M. Structural Engineering

AD-A091 373/1 PC **A03**/MF **A01**
Army Engineer Waterways Experiment Station, Vicksburg, MS.
Application of an Implicit Linear Statistical Analysis to the Estimation of the Resistance of a Reinforced Concrete Beam-Column.
Final rept.,
Paul F. Mlakar. Nov 78, 33p Rept no. WES-MP-N-78-7

For the moments of a function of jointly distributed random variables, an approximate solution is derived that does not require an explicit closed form expression for the derivatives of the function. The solution is based on a linear approximation of the implicit functional relation. This technique is applied to the resistance of a reinforced concrete member subjected to combined bending and thrust, and the results are compared with those obtained from Monte Carlo simulations. The variability of this resistance due to fabrication randomness, which plays a central role in the derivation of a reliability-based design safety factor, is also discussed. Next, the larger uncertainty associated with the resistance of a beam-column, whose individual mean parameters must themselves be estimated as in the condition survey of an existing structure of unknown design, is examined. Finally, the importance of factors omitted from the resistance functional relation is considered. (Author)

N81-10455/6 PC **A04**/MF **A01**
Technion - Israel Inst. of Tech., Haifa. Dept. of Aeronautical Engineering.
Verification of Fatigue Crack Initiation Life Prediction Results.
A. Buch. Mar 80, 56p TAE-400

Crack initiation life estimates obtained with the local strain approach (LSA) and with the conventional nominal stress approach (NSA) were compared with experimental results obtained with stress block loading programs and flight simulation gust loading programs. Programs with and without load peaks were used for testing internally notched 2024-T3 sheet specimens with a very small crack propagation phase. Experimental S-N curves obtained for the notched specimens and assumed to be linear in log sigma sub a - log N coordinates were used for calculations with the NASA method. A material strain-life curve, a cyclic strain stress curve and a K sub F value calculated with a two parameter formula were used for life estimations with the LSA method. Calculations indicated that the life estimates obtained with the K sub F value for R = 0 (pulsating-tension) were more accurate than in the case of K sub F value for R = 1, or in case of using the SCF value in Neuber's notch analysis. The prediction accuracy can be more improved by use of a proper adjustment factor for sufficiently similar loading spectra.

PB81-111908 PC **A07**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
Metric Conversion in the Construction Industries - Technical Issues and Status.
Final rept.,
Hans J. Milton, and Sandra A. Berry. Oct 80, 150p NBS-SP-598

This Special Publication was prepared at the request of the Metric Symposium Planning Committee of the National Institute of Building Sciences (NIBS). It is intended to provide information on technical issues and status of metric conversion in the United States construction industries. It will be made available to attendees at the NIBS Symposium on 'Metric Conversion in the Construction Community' to be held December 2-3, 1980, in Chicago, IL. In addition, it will be available to other affected parties in the construction community. The report contains information on planning for the metric change, current metric activities of professional and industry groups, technical implications in the construction industries, dimensional coordination, metric building products and services, research issues, and timing. It is intended to provide assistance for informed decisionmaking relative to metric conversion for the U.S. construction industries. Also included in the report is a bibliography of relevant construction industries' metric technical information.

PB81-114845 PC **A05**/MF **A01**
Woodrow Wilson International Center for Scholars, Washington, DC.
Soviet Housing and Urban Design,
Steven A. Grant. Sep 80, 76p HUD-IA-595

Contract HUD-H-5108G
Papers presented at Conference held in Washington, DC on December 19, 1979.

The papers in this collection examine a variety of topics, all concerning the promise and problems of housing, construction, and cities in the Soviet Union. The paired format enabled the authors to approach specific subjects from different but complementary viewpoints. The subjects covered include: (a) the centralization and standardization of Soviet urban planning and construction; (b) the current situation and future prospects of Soviet cities, especially new towns; (c) socio-economic aspects of city life, particularly housing; and (d) technical and practical achievements of Soviet construction.

PB81-118150 PC **A07**/MF **A01**
Minnesota Univ., Minneapolis. Underground Space Center.
Earth Sheltered Housing: Code, Zoning, and Financing Issues,
Ray Sterling, Roger Aiken, and John Carmody.
Apr 80, 129p HUD-0001691, HUD/PDR-585
Contract HUD-H-2883

The study consolidates current information on earth sheltered housing, identifies the known advantages and disadvantages of such structures, and examines building codes, zoning ordinances, and financing issues pertinent to earth sheltered housing. The study is intended for a varied audience. A general introduction to earth - sheltered housing is presented, along with historical background and information on the present status of construction and research activity. A discussion of the advantages and disadvantages of earth - sheltered construction is provided, and the major issues and constraints found in building codes that are related to earth - sheltered housing are examined. Other chapters cover major issues and constraints found in zoning ordinances, financing impediments to earth - sheltered housing, and suggestions for potential owners interested in proceeding with an earth - sheltered housing project. Figures and graphs are included. Appendices provide a variety of background information, including a list of 25 references and relevant articles and talks by experts in financing.

14. METHODS AND EQUIPMENT

14B. Laboratories, Test Facilities, and Test Equipment

AD-A090 887/1 Not available NTIS
National Bureau of Standards, Washington, DC.
Precise Measurements with Bingham Viscometers and Cannon Master Viscometers.
Research paper,
J. F. Swindells, R. C. Hardy, and R. L. Cottington.
1953, 11p Rept no. NBS-RP-2479
Availability: Pub. in Jnl. of Research of the National Bureau of Standards, v52 n3 p105-115 Mar 54 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A090 904/4 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Subtraction of Signal Overlaps in Rutherford Backscattering Spectrometry.
Journal article,
Zong-Long Liau. 25 Apr 79, 4p JA-4978, ESD-TR-80-52
Contract F19628-80-C-0002
Pub. in Applied Physics Letters, v36 n1 p51-53, 1 Jan 80.

No abstract available.

AD-A090 953/1 PC **A02**/MF **A01**
Materials Research Labs., Ascot Vale (Australia).
Data Controller System for Fatigue Crack Monitoring Using a Potential Drop Technique.
Technical note,
Barry J. Baxter. Sep 79, 24p Rept no. MRL-TN-429

This report describes the design of a control unit to interface with (1) a digital voltmeter calibrated to respond to fatigue crack growth, (2) load and cycle data from a servo hydraulic system, and (3) a desk calculator. The calculator is programmed to determine crack length, crack growth rate and stress intensity factors. Pre-set limits on the load and number of cycles permits termination of the test when the levels have been exceeded. Appropriate power supplies for the units have also been designed and are described. (Author)

AD-A091 058/8 PC **A05**/MF **A01**
Naval Postgraduate School, Monterey, CA.
Evaluation of Factors Affecting Repeatability and Accuracy of Turbine Rig Test Results.
Master's thesis,
Terry Paul Eargle. Jun 80, 93p

An experimental study was carried out to resolve anomalies and to determine the sources of inaccuracies which had hitherto been present in results from the Turbine Test Rig at the NPS Turbopropulsion Laboratory. Internal modifications to the rig's waterbrake dynamometer are reported which improved the RPM control everywhere but in the range 17,000 - 18,500 RPM. From an analysis of test results and theoretical estimates, it was concluded that with normal atmospheric humidity supply temperatures close to 700 R were necessary to eliminate the influence of water condensation on blade row performance measurements, since the stator nozzles were supersonic. A detailed uncertainty analysis was carried out which successfully isolated the major causes of inaccuracies in loss data derived from rig measurements. Recommendations were made which, if followed, should result in repeatable and accurate measurements of blade row losses. (Author)

AD-A091 080/2 MF **A01**
Naval Postgraduate School, Monterey, CA.
Trasonic Cascade Wind Tunnel Modification and Initial Tests.
Master's thesis,
Karl Ferdinand Volland, Jr. Jun 80, 107p
Availability: Microfiche copies only.

The transonic cascade wind tunnel at the Turbomachinery Laboratory was modified by incorporting a perforated wall section in the upper nozzle block. The purpose of this modification was to cancel the oblique shock waves from the cascade blades and to aid in starting the supersonic flow in the tunnel. Tests results indicated that the modification performed successfully. Supersonic flow was established through the cascade blading which models the relative flow at the tip of the laboratory's transonic compressor. A butterfly valve must yet be installed in the cascade exhaust to produce back pressures corresponding to the compressor's transonic operation. (Author)

BNL-27919 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Proportional Wire Calorimeter for Magnet Pole Tips.
D. Kraus, T. Ludlam, J. Renardy, W. Willis, and E. Zurfluh. 1980, 6p CONF-801103-2
Contract AC02-76CH00016
IEEE nuclear science symposium, Orlando, FL, USA, 5 Nov 1980.

A total absorption calorimeter is designed to have magnetic properties comparable to those of ordinary steel, and thus can be incorporated into the poles of a spectrometer magnet without compromising the field quality. A test device has been built which consists of an iron structure penetrated by a finegrain pattern of holes, each acting as a proportional tube such that 90% of the volume is occupied by iron. Measurements of the energy and space resolution of this device in a high energy beam will be presented. (ERA citation 05:037111)

BNL-28267 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Water Vapor Pressure Gauge.
D. Edwards, Jr., and D. Gillette. 1980, 9p CONF-801037-7
Contract AC02-76CH00016
American Vacuum Society conference, Detroit, MI, USA, 13 Oct 1980.

An inexpensive pressure gauge, able to measure the N sub 2 and H sub 2 O components within a vacuum system in the pressure range 1 mu to 400 mu is described and results of tests of the device are reported. (ERA citation 05:035360)

BNL-28268 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Interrupted Pumpdown of a Vacuum System.
D. Edwards, Jr. 1980, 8p CONF-801037-8
Contract AC02-76CH00016
American Vacuum Society conference, Detroit, MI, USA, 13 Oct 1980.

The pressure rise due to a surface outgassing process following a real pump closure has been analyzed and found under a physically reasonable parameter selection to occur very quickly yet result in a very slight actual pressure change. Real leaks thus should be able to be able to be distinguished from surface outgassing processes by this technique. (ERA citation 05:037075)

CONF-800814-18 PC **A02**/MF **A01**
Exxon Nuclear Idaho Co., Inc., Idaho Falls.
Continuous Realtime Radioiodine Monitor Employing on-Line Methyl Iodide Conversion.
S. J. Fernandez, and B. G. Motes. 1980, 11p
Contract AC07-79ID01675
180. American Chemical Society meeting/2. chemical congress of the North American Continent, San Francisco, CA, USA, 24 Aug 1980.

An integrated exp 14 C, exp 129 I, and exp 85 Kr monitor was proposed by Fernandez, et al. that separates exp 129 I from exp 85 Kr by selective permeation across thin silicone rubber membranes. Subsequent studies of the permeation of CH sub 3 I and I sub 2 through silicone rubber membranes demonstrated that I sub 2 transport across the membranes is too slow to be useful in a realtime monitor. Transport of methyl iodide, however, is rapid and gives a separation factor of greater than 100 from exp 85 Kr. (ERA citation 05:037112)

HEDL-SA-2098-FP PC **A02**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Combining within and Between Instrument Information to Estimate Precision.
J. W. Jost, J. L. Devary, and J. E. Ward. 1980, 17p CONF-800820-9
Contract AC14-76FF02170
American Statistical Society meeting, Houston, TX, USA, 11 Aug 1980.

When two instruments, both having replicated measurements, are used to measure the same set of items, between instrument information may be used to augment the within instrument precision estimate. A method is presented which combines the within and between instrument information to obtain an unbiased and minimum variance estimate of instrument precision. The method does not assume the instruments have equal precision. (ERA citation 05:035362)

INP-979/PS PC **A05**/MF **A01**
Institute of Nuclear Physics, Krakow (Poland).
Backscattering-Channelling Measurements of Radiation Damage.
E. Maydell-Ondrusz. Oct 77, 76p
In Polish.Thesis.
U.S. Sales Only.

An effective and nondestructive method of measuring the concentration of postimplantation radiation damage was developed. The radiation

damage was produced by means of 70 keV heavy ions implantation into silicon single crystals. The method is based on the channelling effect and Rutherford backscattering of charged particles on damaged single crystals. Alpha particles were accelerated in C-48 INP cyclotron to the energy of 1.4 MeV. Concentrations of radiation damage were obtained from an analysis of backscattering yields. The paper contains the theoretical basis of effects used, description of the experimental apparatus and experimental results. Moreover the comparison between theoretical predictions on the radiation damage production of F.F. Morehead et al. and experimentaly obtained relations is given. (Atomindex citation 11:511796)

JAERI-M-8207 PC **A03**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Measurement of Small Surface Areas Using Kr Adsorption Technique.
K. Shiba, Y. Takahashi, and A. Ito. Apr 79, 29p
In Japanese.
U.S. Sales Only.

An apparatus is described for measuring surface areas using BET Kr adsorption technique. The use of a capacitance pressure sensor (diaphragm type) has made it possible to measure a small surface area in high accuracy. The errors in measuring larger areas than 150 cm exp 2 are estimated to be within 5%. The apparatus can measure as small areas as 20 cm exp 2 with the error of about 30%. The report consists of chapters such as principles of surface area measurement, outline of apparatus, measurement and calculation, accuracy and detection limit, and discloses experience gained through about 2 years' operation of the apparatus. (Atomindex citation 11:514519)

JINR-R-10-12554 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Computing Techniques and Automation.
Testing Programs for BPS-75 Measuring Projector.
A. Ya. Astakhov, and G. M. Komov. 1979, 12p
In Russian.
U.S. Sales Only.

Testing programs for optical and mechanical parts of the projector and CAMAC electronic blocks which control them via computer are described. The operation of optical-mechanical part is tested by computer commands and by automatic analysis of state of flags, registers and other signals. Some tests switch on/off the projecting lamps, control buffer loops, check the carriage speed and film run speed. At the end of testing an operator gets through the teletype state diagnostic of the measuring projector. (Atomindex citation 11:528915)

LA-8412-MS PC **A03**/MF **A01**
Los Alamos Scientific Lab., NM.
Industrial Applications of Computed Tomography at Los Alamos Scientific Laboratory.
R. P. Kruger, R. A. Morris, G. W. Wecksung, G. Wonn, and R. London. Jun 80, 43p
Contract W-7405-ENG-36

A research and development program was begun two years ago at the Los Alamos Scientific Laboratory (LASL) to study nonmedical applications of computed tomography. This program had several goals. The first goal was to develop the necessary reconstruction algorithms to accurately reconstruct cross sections of nonmedical industrial objects. The second goal was to be able to perform extensive tomographic simulations to determine the efficacy of tomographic reconstruction with a variety of hardware configurations. The final goal was to construct an inexpensive industrial prototype scanner with a high degree of design flexibility. The implementation of these program goals is described. (ERA citation 05:035275)

N81-10005/9 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
A Fan Pressure Ratio Correlation in Terms of Mach Number and Reynolds Number for the Langley 0.3 Meter Transonic Cryogenic Tunnel.
P. L. Lawing, and C. L. Ladson. Nov 80, 21p
NASA-TP-1752, L-13713

Calibration data for the two dimensional test section of the Langley 0.3 Meter Transonic Cryogenic Tunnel were used to develop a Mach number-Reynolds number correlation for the fan pressure ratio in terms of test section conditions. Well established engineering relationships combined to form an equation which is functionally analogous to the correlation. A geometric loss coefficient which is independent of Reynolds number or Mach number was determined. Present and anticipated uses of this concept include improvement of tunnel control schemes, comparison of efficiencies for operationally similar wind tunnels, prediction of tunnel test conditions and associated energy usage, and determination of Reynolds number scaling laws for similar fluid flow systems.

N81-10349/1 PC **A02**/MF **A01**
Health and Safety Executive, Sheffield (England).
A Fast-Response Two-Color Pyrometer.
D. P. Cutler. May 79, 8p HSL-TP-5, ISBN-0-7176-0014-9

An instrument was developed to study the rate of the rise and fall of temperature of a rapidly heated surface of unknown emissivity. A day to day reproducibility of within + or - 35 C is achieved in measurements of temperatures in the range 500 to 1700 C with heating times, from ambient, of about 0.5 ms. The instrument is self-contained and incorporates outlet sockets to either an oscilloscope or waveform analyzer, and is housed within a modified camera body. The target is sighted using the focusing system of the camera.

PATENT-4 228 009 Not available NTIS
Department of Health, Education, and Welfare, Washington, DC.
Toroidal Coil Planet Centrifuge.
Patent,
Yoichiro Ito. Filed 4 Jun 79, patented 14 Oct 80, 9p PB81-116634, PAT-APPL-6-045 052
Supersedes PB-300 942.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

An apparatus for countercurrent chromatography consisting of a coiled separation column which is rotated about the axis about which it is wound and the axis is also rotated about a main axis. The embodiments of the invention are based on the fact that the pattern of the centrifugal force field greatly changes with the ratio of the two radii of rotation and depending on the particular effect desired, the apparatus is configured to achieve the most effective force field to gain the effect. The separation column is a tube helix wound around a flexible core member which can be wound onto the coil holder in various orientations to further effect the desired results.

PB81-115289 PC **A02**/MF **A01**
National Research Council, Washington, DC.
National Transonic Facility: A Review of the Operational Plan.
Final rept.,
Hans W. Liepmann, Richard E. Black, Robert O. Dietz, Mark E. Kirchner, and William R. Sears. Mar 80, 25p
Contract NASw-2342

The report reviewed the proposed National Transonic Facility (NTF) operational plan, particularly those procedures aimed at insuring the facility's most efficient use for research and development purposes by all elements of the user community. The new NTF, the latest addition to the existing National Unitary Wind Tunnel Plan, will provide an aerodynamic test capability significantly exceeding that of other transonic regime wind tunnels now available. The committee endorsed the proposed use of the NTF by the Department of Defense (DoD) in new systems development and by the aircraft industry in civil aircraft development. The committee also suggested a limited number of academic research programs that might use the NTF, some of which may be funded by NASA. In general, the committee concluded that the NTF operational plan is a good one and will benefit the user community and the nation through use of the latest management, technical, instrumentation, and model building techniques available in the specialized field of aerodynamic analysis and simulation. Another important suggestion was that NASA hold an annual conference to discuss wind tunnel research results and to report on new developments that will further improve the utilization and cost effectiveness of the NTF and other wind tunnels.

PB81-116873 PC **A03**/MF **A01**
National Research Council, Washington, DC.
NASA's Aeronautics Program: Systems Technology and Experimental Programs.
Final rept.
1980, 43p
Contract NASW-2342

This second report of the Aeronautics Assessment Committee presents the results of an assessment of the appropriateness and balance of work by NASA directed to far-term advances in technology, and of in-house work and out-of-house work, and contains recommendations to improve individual programs and projects in this regard. The committee's considered judgment was that NASA's work in aeronautics generally has been appropriately allocated to bring the best effort to bear on the particular task at hand. A few instances are cited in which shifts in allocation of support are recommended. The committee believed that criteria for achieving an appropriate balance based on a quantitive ratio of in-house to out-of-house effort could result in a less efficient and less effective program if adhered to rigorously, it was therefore suggested that the appropriate balance is best determined by considering the expected yields and the objectives of individual programs in light of those needs.

PB81-118515 Not available NTIS
National Bureau of Standards, Washington, DC.
A Review of the Six-Port Network Analyzer Development at NBS.
Final rept.,
G. F. Engen. 1980, 2p
Pub. in Proc. Conf. on Precision Electromagnetic Measurements, Braunschweig (Germany, F.R.) Jun 23-27, 1980, IEEE Cat. No. 80CH1497-71M, p323-324 1980.

In recent years a network analyzer, providing both amplitude and phase, has been developed which is based upon the use of a non-ideal six-port network and four detectors which provide amplitude response only. The interest in this method is reflected by a bibliography of more than forty items which span the past seven years. This paper will review this development, highlight the important features, and identify remaining problem areas.

PB81-118580 Not available NTIS
National Bureau of Standards, Washington, DC.
Applications of a Low Noise Potentiostat in Electrochemical Measurements,
U. Bertocci. Sep 80, 4p
Pub. in Jnl. Electrochem. Soc. 127, n9 p1931-1934 Sep 80.

Measurements on two electrochemical systems, copper in copper sulfate and aluminum in boric acid: sodium tetraborate buffer with and without chloride added, have been carried out employing a low-noise potentiostat developed and built at NBS by recording the amplitude spectrum of the fluctuations in the current density. In the case of copper, the current spectra resulted to be the deterministic response of the electrode to the noise voltage generated by the potentiostat. The electrode characteristics for charge-transfer and for diffusion could be obtained from the impedance plots derived from the measurements when the level of the applied signal was of the order of 10 to the -7 power V. In the case of aluminum, the deterministic response observed in the absence of pitting was overcome by random fluctuations in the current in conditions leading to pitting. It is shown that the onset of pit formation can be detected from noise measurements. The significance of the information obtained in electrochemical noise measurements is briefly discussed.

PB81-800542 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Standard Reference Materials. 1964-October, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-Oct 80,
George W. Reimherr. Nov 80, 278p

Supersedes PB80-800493, and NTIS/PS-78/1096.

The cited reports present research concerning standard reference materials for science and industry. Fields covered include chemistry, physics, pollution detection, and metallurgy. Most of the references originated from the National Bureau of Standards (NBS); however, not all NBS research on reference materials and standard methods are covered. (This updated bibliography contains 271 citations, 19 of which are new entries to the previous edition.)

SAND-80-1071 PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Technique for Calibrating V Probes.
C. R. McClenahan. Aug 80, 21p
Contract AC04-76DP00789

V probes designed by Maxwell Laboratories, Inc. (MLI) have been extensively used at the Air Force Weapons Laboratory to measure the voltage of fast capacitor banks. The straightforward calibration method of pulsing a high voltage across the voltage probe typically produces only millivolts of output signal. Based on a suggestion by MLI, a new method to calibrate the probes has been devised. This technique, which uses a capacitive discharge and measures the dV/dt directly, has the advantage of producing an output signal of nearly a volt. A circuit has been designed and constructed to provide an appropriate ringing discharge which can be used to calibrate V probes. The theory of V probes and their calibration is discussed, and the construction and operation of the discharge circuit is presented. Finally, as an example of the calibration technique, details of how to calibrate a V probe are presented. A precision of 4% is readily attainable in the V probe calibration. Such accuracy should make possible routine 5% voltage measurements on pulsed power systems. (ERA citation 05:035261)

SAND-80-2034C PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
National and International Drawing Standards: Moving Toward Better Alignment with Y14.5.
P. A. Nicovich. 1980, 24p CONF-801051-1
Contract AC04-76DP00789
75. SAE anniversary aerospace congress, Los Angeles, CA, USA, 13 Oct 1980.

The task of revising the national standard on Dimensioning and Tolerancing, begun seven years ago, required close coordination between the Y14.5 Subcommittee and the US expert members who participated in related activities of the International Organization for Standardization. The revised drawing standard about to be issued reflects additional international alignments in areas of metrication, symbology, and conventions. Differences remain in the prescribed symbol for indicating a datum feature and in a Principle of Independency, the latter unacceptably absolving size limits from controlling the geometric form of an individual feature. More US member experts will be needed on the Y14.5 Subcommittee to uphold US viewpoints in the writing of international drawing standards of a pragmatic kind. (ERA citation 05:037040)

14C. Recording Devices

AD-B037 431/4 PC **A22**/MF **A01**
David W. Taylor Naval Ship Research and Development Center, Bethesda, MD.
Photographic Video Disc Technology Assessment Report.
Final rept.
Oct 76, 517p GIDEP-E124-1642
Supersedes Rept. no. E066-1960, AD-A042 107.
Distribution limitation now removed.

No abstract available.

15. MILITARY SCIENCES

15B. Chemical, Biological, and Radiological Warfare

AD-B042 882/1 PC **A04**/MF **A01**
Honeywell, Inc., St. Petersburg, FL. Tactical Support Center.
Feasibility Studies on the Army Ionization Detector - Additional R&D Studies.
Final rept. 11 Jan 78-31 Jul 79,
B. W. Castleman , M. H. Cates , and F. L. Giraudi. Oct 79, 59p 879-16047, ARCSL-CR-79069, SBIE-AD-E410202
Contract DAAA15-76-C-0146
Distribution limitation now removed.

The objective of amendment P0007 to contract DAAA15-76-C-0146 was to study the feasibility of using an ion mobility spectrometer (IMS) to provide increased-chemical-warfare agent sensitivity relative to other types of detectors. A Honeywell-built IMS was tested with agents, simulants, and interferences. Nerve agents and simulants were successfully detected at the parts-per-billion concentration. The system was not sensitive to blister agent mustard, but did respond to lewisite. Smokes and engine exhausts were not serious interferences. The objective of amendment P00011 to contract DAAA15-76-C-0146 was to study the feasibility of using an external add-on corona generator with the Air Force A/E23D-3 in order to detect the chemical warfare agent mustard. A corona generator tube and high-voltage power supply was fabricated and tested with mustard at CSL.

15C. Defense

AD-A090 823/6 PC **A06**/MF **A01**
Texas Dept of Public Safety Austin Div of Disaster Emergency Services
Texas Emergency Resource Management. Volume I.
Final rept. 1 Oct 78-30 Sep 79,
Ashley C. Eledge, Robert L. Orton, and Soon O. Merz. 30 Sep 79, 105p
Contract DCPA01-78-C-0321
Includes detachable summary. See also Volume 2, AD-A090 824.

This document is Volume I of Texas Emergency Resource Management (TERM), a study which analyzes the methods, procedures and techniques for constructing a state plan for the emergency management of resources in a nuclear attack emergency or crisis relocation of the population from high risk areas to areas of lesser risk. The study contains organizational charts for each grouping of essential resources and assignment of responsibilities for state agency action as well as a model state plan in Volume II. Volume I also contains information and ideas from seven of nine states' queries relative to emergency resources management during the crisis relocation phase of a national emergency. (Author)

AD-A090 824/4 PC **A13**/MF **A01**
Texas Dept of Public Safety Austin Div of Disaster Emergency Services
Texas Emergency Resource Management. Volume II.
Final rept. 1 Oct 78-30 Sep 79,
Ashley C. Eledge, Robert L. Orton, and Soon O. Merz. 30 Sep 79, 296p
Contract DCPA01-78-C-0321
See also Volume 1, AD-A090 823.

This document is Volume II of Texas Emergency Resource Management (TERM). Part A covers emergency management of resources and contains overall State policies and guidance for the provision and use of essential resources to meet urgent needs in the State in a nuclear attack emergency or crisis relocation of the population. It also describes the system and identifies roles of Federal, State and local government organizations for the emergency management of essential resources available to the State. Part B includes separate resource sections containing specific provisions and procedures to implement overall State resource policies and guidance in the following resource categories.

AD-A091 209/7 PC **A03**/MF **A01**
RAND Corp., Santa Monica, CA.
A Conceptual Framework for a National Strategy on Nuclear Arms.
Interim rept.,
Carl H. Builder. Sep 80, 36p Rept no. RAND/R-2598-AF
Contract F49620-77-C-0023

This essay proposes a national strategy for nuclear arms. It argues for new ways of thinking about why we possess nuclear arms and how we should plan for their control and use. The arguments are developed within a conceptual framework composed of three national security dimensions: (1) the goals supported by the possession or use of nuclear weapons, (2) the immediate objective of our postures, and (3) the perceived proximity of conflicts. The formulation of logical strategy domains within this framework reveals some opportunities that have been historically neglected in U.S. nuclear arms policies. In particular, the essay suggests that our arms control efforts should be reoriented toward limiting theater forces and encouraging strategic defenses. (Author)

AD-A091 241/0 PC **A10**/MF **A01**
Mellon Inst., Pittsburgh, PA.
DDP Development Facility Capabilities for Effective Acquisition of DDP Software and Hardware,
L. L. Cheng, M. A. Kowalski, D. V. Klein, M. L. Soffa, and W. T. Sze. Jun 80, 210p
Contract DASG60-80-C-0016

This report documents the results to-date of the study titled Distributed Data Processing (DDP) Software/Hardware Support Plan in support of the Ballistic Missile Defense (BMD) Terminal Phase. This study was initiated mid-January 1980 and its purpose is to identify the capabilities required by BMD in order to have high confidence that full scale development (FSD) of a DDP subsystem can be initiated and completed within a short (3 to 4 year) time frame. The study is directed toward the definition of a DDP development facility for BMD that will help achieve the goal of a speedy development. The BMD DDP subsystem referred to in this report is assumed to be general in nature, i.e., its components may be hardware or software. Hardware components may be general purpose or specially developed for this application; they may already exist or are yet to be developed. Software components may consist of a combination of high order languages, assembly languages and microcoded modules.

AD-A091 306/1 PC **A03**/MF **A01**
Center for Naval Analyses, Alexandria, VA. Inst. of Naval Studies.
French Naval Policy Outside of Europe.
Professional paper,
Stephen S. Roberts. Sep 80, 37p Rept no. CNA-[illegible]-294

French naval policy, as outlined by senior naval officers and informed observers, is in many ways similar to French defense policy. In particular, the navy's views on strategic nuclear deterrence and the defense of metropolitan France are the logical maritime equivalent of those of the Army, Air Force, and Ministry of Defense. However, in the area of defense policy outside Europe, French naval writings go further than those of the other services or the ministry. The naval writers have defined an additional threat, 'indirect strategy,' that

they feel France faces overseas, and they have adapted French deterrence theory in an effort to respond to it. The term 'indirect strategy' was originated by the noted French strategist General Andre Beaufre. It is one of two components of his concept of 'total strategy,' the other being 'direct strategy.' Direct strategy is the achievement of a decision (or of deterrence) by primarily military means, while 'the essential feature of indirect strategy is that it seeks to obtain a result by methods other than military victory.

AD-B017 344/3 PC **A04**/MF **A01**
Orlando Technology Inc Fla
Investigation of Oblique Shocks and Edge Effects for Underground Targets. Volume I. Oblique Shocks.
Final rept. Dec 75-Jun 76,
Hans R. fuehrer, and John W. Keeser. Jan 77,
52p AFATL-TR-77-1-Vol-1
Contract F08635-76-C-0155
Distribution limitation now removed.

This report summarizes results of a six-month test and analysis program to establish the effects of oblique shock waves on buried concrete structures. The objective of this program was to generate basic test which would show the effects of various corner angles (20 to 160 degrees) on a shock wave impinging a buried structure. The transmitted impulse was measured by photographic and electronic means. The initial velocity of a steel fly-off plate was obtained from high-speed photography. Quartz pressure gages were used to measure maximum force and total impulse as a function of the corner angle. Maximum force was found to be relatively constant at 20-, 30-, and 45-degree corner angles, drop sharply at 60 degrees and climb steadily from 90- to 160-degree corner angles. Initial fly-off velocity followed a similar pattern decreasing at 60 degrees, then rising steadily. The force reduction at 60 degrees may be the result of the formation of a Mach stem along the cone surface. Recommendations are to use hydrodynamic computer codes to better identify the mechanism involved, and to continue experimentation using the quartz pressure gages and very charge weight, stand-off, and other parameters to fully resolve effects of shock coupling with oblique geometries. (Author)

AD-B017 483/9 PC **A04**/MF **A01**
Orlando Technology Inc Fla
Investigation of Oblique Shocks and Edge Effects for Underground Targets. Volume II. Edge Effects.
Final rept. Dec 75-Jun 76,
Hans R. Fuehrer, and John W. Keeser. Jan 77,
61p AFATL-TR-77-1-Vol-2
Contract F08635-76-C-0155
See also Volume 1, AD-B017 344L.
Distribution limitation now removed.

This report summarizes results of a four-month test and analysis program to establish maximum breach distances for explosives placed at several positions about the corner of a buried concrete structure. The objective of the program was to generate test data showing explosive charge stand-off distances at which buried concrete structures will be breached for charges placed on the corner diagonal, the corner shear line, and the mid-span of the wall. Composition C-4 explosive charges were detonated against high strength concrete cubicles with walls 4 and 8-inches thick. One-third scaling was used for all tests, and quartz pressure transducers recorded force and impulse data on the target wall and in the free soil. Results of the study showed that difficulty of breaching the walls of the buried concrete targets increased dramatically as the explosive charge is moved from mid-span to shear line to diagonal positions. Recommendations are to initiate use of these findings in target vulnerability analysis of high explosive munitions encountering underground concrete structures. (Author)

15D. Intelligence

AD-A090 957/2 PC **A02**/MF **A01**
Army War Coll. Strategic Studies Inst., Carlisle Barracks, PA.
Military Strategy in Transition.
Military issues research memo.,
William O. Staudenmaier. 20 Nov 78, 23p

This report examines the changes in military strategy necessitated by changes in the international strategic environment since 1945. It discusses the nature of military strategy and the constraints that act upon it. The report considers the nature of the present international environment and the trends which impact on it. Finally, it assesses the predicted strategic environment of the 21st century and its effect on US strategy and force structure. (Author)

AD-388 286 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 1ST Military Intelligence Battalion (Ars).
Operational rept for quarterly period ending 30 Apr 67.
15 May 67, 17p OACSFOR-OT-RD-670628
Distribution limitation now removed.

No abstract available.

15E. Logistics

AD-A091 031/5 PC **A11**/MF **A01**
MITRE Corp., Bedford, MA.
FY 79 Software Acquisition Process Model Task. Revision 1.
Final rept.,
Oscar Shapiro, and John B. Glore. Jul 80, 229p
MTR-3871-REV-1, ESD-TR-80-129-REV-1
Contract F19628-80-C-0001

This final report on the FY 79 Project 5220 Software Acquisition Process Model Task (522F) presents the approach taken to process model definition, quantification, and simulation; accomplishments; and status at the fiscal year's end. The report also identifies desirable improvements and outlines a plan for their incorporation and application in successive process model versions. The report contains diagrams that represent the Full-Scale Development Phase of the Major System Acquisition Life Cycle. These diagrams can provide useful reference material for anyone who is (or expects to be) engaged in the planning or monitoring of a system development contract. Revision 1 eliminates references to several documents not in the public domain. These changes, made to secure public release, are all minor. In addition, minor errors have been corrected. (Autrhor)

AD-A091 114/9 PC **A03**/MF **A01**
Naval Ocean Systems Center, San Diego, CA.
Fleet Readiness Office FY 78 Activity Summary.
Summary rept. no. 2, Oct 77-Oct 78.
1 Mar 79, 30p Rept no. NOSC/TD-214

The Fleet Readiness Office (FRO) exists to serve the needs of the Fleet in a direct and timely fashion. This means solving existing operational problems now. But it also means anticipating problems and needs that are likely to arise in the near future. To attain these ends FRO maintains close and constant liaison with Navy and Marine Corps operational commands and with the technical community at NOSC. Through the interplay of continuous feedback, FRO is able to act as both a conduit and a catalyst--carrying information of Fleet operational problems to the technical community and at the same time stimulating the technical community to direct its efforts toward potential Fleet problems. FRO discharges its mission primarily by establishing a number of programs of varying scope and technical complexity. Representative projects have been selected from these programs to document in this report NOSC's major technical achievements in support of the Fleet in FY 1978.

AD-A091 121/4 PC **A03**/MF **A01**
Logistics Management Inst., Washington, DC.
Warranties on Commercial Items within DoD.
Final rept.,
William G. Moeller, and Richard P. White. Oct 80, 30p
Contract MDA903-77-C-0370

This report examines warranties on commercial items bought for use by DoD components. Although the study also included subsistence, textiles, and clothing, primary attention was given to administrative use vehicles, light trucks, household appliances, and material handling and construction equipment. The report concludes that emphasis must be placed on administration of warranty provisions by the activities using the equipment rather than by the contracting office and the terms of the contract; that responsibilities must be assigned to and procedures must be developed by the maintenance organizations at the user level; that in-house service warranties, a form of billback used extensively by private fleet owners, by state and local Governments, and by USPS and GSA, should be adopted by DoD organizations to get greater benefit from warranties on commercial items. Under the in-house service warranty, the using organization at its option, may take the equipment to a dealer for repair or do the work itself and bill the manufacturer for the cost of labor and parts used in doing the work. The report also concluded that maximum benefit would not be realized unless some way could be found to offset the disincentive of the current law which requires such reimbursements to go to the U.S. Treasury and not to the organization that did the work.

AD-A091 152/9 PC **A11**/MF **A01**
State Univ of New York At Buffalo School of Management
Use of the Award Fee in Air Force System and Subsystem Acquisition.
Final rept.,
Raymond G. Hunt. Mar 80, 249p
Contract F33615-78-C-5230

This study had three objectives: to clarify the conceptual basis of award fee contracting methods; to describe empirically their application in Air Force Systems Command (AFSC) programs; and to identify lessons which could be learned about the award fee method from these applications. From previous research and existing literature, a 'theory' of the award fee approach to acquisition was formulated which presents it as a distinctive management tool for planning and controlling performance in contracted system acquisition. Fifteen applications of the award fee contracting method in the AFSC were selected as cases from which to derive empirical descriptions of patterns of award fee application. These were analyzed for their consistency with award fee theory. Interviews with government and contractor personnel explored their experiences with the award fee and their judgments about it. Thus, an 'input evaluation' of the award fee approach to acquisition was accomplished to provide a basis for identifying policy and technical recommendations for its more effective future use, and for identifying award fee-related research needs. (Author)

AD-A091 232/9 PC **A04**/MF **A01**
Army Procurement Research Office, Fort Lee, VA.
Reasons for Letter Contracts.
Final rept.,
C. Eugene Beeckler, and John I. Neely. Sep 80,
71p Rept no. APRO-810

The study objectives were to determine factors in the establishment of requirements, contract administrative leadtime and acquisition planning that lead to the use of letters contracts and recommend any necessary changes to current policy and procedures for the use of letter contracts. The authors reviewed current policy, selected review and analysed pre-award letter contract files, and interviewed contracting policy and operations and requirement personnel at selected Us Army Materiel Development and Readiness Command Major Subordinate Commands. Both official and unofficial reasons for letter contracts and techniques for the improvement of letter contract use were identified. A letter contract is an essential option available to the contracting officer in selection of the method to achieve a two party agreement and immediate commencement of work for supplies and services for the national defense. Other findings,

conclusions and recommendations are provided in the study. (Author)

AD-A091 254/3 PC **A03**/MF **A01**
Army War Coll., Carlisle Barracks, PA.
The Use of Automated Data Processing for the Enhancement of Mobilization of the Reserve Components,
Gary E. Schultz. 28 May 80, 33p

Mobilization readiness and rapid assimilation of reserve component units into the active force is ever more important today with greater reliance upon the use of the reserves as part of the Total Force. In armed confrontation, reaction time must be significantly reduced. This study discusses the issues relating to the use of Automated Data Processing in the transition to wartime conditions. These issues have been derived from other Army studies and reports of mobilization exercises. Suggested alternatives for these issues and additional data was obtained through interviews with DA staff and MACOM staff officers. This study finds that although the use of ADP may enhance rapid mobilization, there are inadequate communications, ADP equipment, and ADP systems to support this task. Provision of standard ADP tools in accordance with centralized systems management will aid in the solution of these problems. (Author)

AD-A091 255/0 PC **A03**/MF **A01**
Army War Coll., Carlisle Barracks, PA.
Reducing the Cost of Procurement of Material and Services,
Chester F. Johnson. 28 May 80, 29p

Commercial payments and stock fund division sales are fruitful areas for substantial cost savings. This can be accomplished with a little imagination, relaxing of DoD regulations, and government policies. This is especially true considering the state of the art of financial management, major computerized financial and supply systems, and our ability to use the fast pay and certificate of conformance procedures currently authorized in procurement instructions and regulations. This paper analyzes the commercial accounts procedures and intra/inter agency stock fund transactions and recommend changes that can be made to realize substantial cost savings. Due to the lack of sufficient research capability and time the amounts and figures used are approximates. Actual figures are available and can be obtained at a later date. The cost savings are identified more with the activities listed in the first paragraph, but they are applicable throughout the government as the same basic procurement and payment procedures are used by all government agencies.

AD-A091 308/7 PC **A07**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH.
Analysis of the 323rd Flying Training Wing Using Organizational Development and the Action Research Model: A Communications Audit.
Master's thesis,
Lloyd W. Patterson. 15 May 79, 126p Rept no. AFIT-CI-79-176T

Organizational Development techniques were used to find and correct problems within the 323rd Field Maintenance Squadron at Mather Air Force Base, California. The questionnaire developed for the study was left in the wing for use by the rest of the squadrons in the wing. The data obtained was fed back to a representative group of the organization who made recommendations for improvement to the unit commander. The commander implemented changes based on the suggestions of the feedback group. This study presents evidence that a servicewide organizational development program could be beneficial to the Air Force. To date, the Army is the only armed service with a servicewide organizational development program. The Navy does employ some civilian organizational development consultants. The Air Force could slightly modify its Organizational Climate Survey program, and create a servicewide program with very little increase in cost. The Air Force should therefore adopt organizational development techniques.

AD-385 747 PC **A03**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Operational Report for Quarterly Period Ending 31 July 1966 (Rcs Csfor-65), Headquarters, 34TH General Support Group (Am and S).
15 Aug 66, 38p OACSFOR-OT-RD-660284
Distribution limitation now removed.

No abstract available.

AD-387 467 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 5TH Transportation Command.
Operational rept. for quarterly period ending 31 Oct 67.
8 Nov 67, 15p OACSFOR-OT-RD-T674272
Distribution limitation now removed.

No abstract available.

15F. Nuclear Warfare

PB81-112492 PC **A06**/MF **A01**
Mathematics and Computation Lab. (FEMA), Washington, DC.
React User's Guide.
Final rept.
Sep 80, 109p MCL-TM-251-REV-5
Supersedes PB80-184781.

The React query package is an interactive damage prediction system for use during and following a nuclear attack. It provides senior decision makers with quick access to selected data about the status of critical resources relative to the weapon detonations that have occurred. The relatively simple English-like language used for entering queries negates the need for subject matter specialists having knowledge of computers.

15G. Operations, Strategy, and Tactics

AD-A090 842/6 PC **A99**/MF **A01**
Naval Postgraduate School, Monterey, CA.
Lanchester-Type Models of Warfare. Volume I.
Final rept. 1 Oct 79-30 Sep 80,
James G. Taylor. Oct 80, 606p ARO-16403.1-M-VOL-1
Contract MIPR-ARO-34-79
See also Volume 2, AD-A090 843.

This monograph is a comprehensive treatise on Lanchester-type models of warfare, i.e. differential-equation models of attrition in force-on-force combat operations. Its goal is to provide both an introduction to and current-state-of-the-art overview of Lanchester-type models of warfare as well as a comprehensive and unified in-depth treatment of them. Both deterministic as well as stochastic models are considered. Such models have been widely used in the United States and elsewhere for the modelling of force-on-force attrition over the complete spectrum of combat operations, from combat between platoon-sized units through theater-level air-ground combat. This material should be of interest primarily to individuals concerned with defense planning, quantitative aspects of military analysis, military OR, war gaming, or combat modelling, although it may also be of interest to the reader concerned with the modelling and analysis of other dynamic systems. It should also be of interest to the concerned citizen who is interested in the foundations for defense analysis and has the appropriate technical background. (Author)

AD-A090 843/4 PC **A99**/MF **A01**
Naval Postgraduate School, Monterey, CA.
Lanchester-Type Models of Warfare. Volume II.
Final rept. 1 Oct 79-30 Sep 80,
James G. Taylor. Oct 80, 820p ARO-16403.1-M-VOL-2
Contract MIPR-ARO-34-79
See also Volume 1, AD-A090 842.

This monograph is a comprehensive treatise on Lanchester-type models of warfare, i.e. differential-equation models of attrition in force-on-force combat operations. Its goal is to provide both an introduction to and current-state-of-the-art overview of Lanchester-type models of warfare as well as a comprehensive and unified in-depth treatment of them. Both deterministic as well as stochastic models are considered. Such models have been widely used in the United States and elsewhere for the modelling of force-on-force attrition over the complete spectrum of combat operations, from combat between platoon-sized units through theater-level air-ground combat. This material should be of interest primarily to individuals concerned with defense planning, quantitative aspects of military analysis, military OR, war gaming, or combat modelling, although it may also be of interest to the reader concerned with the modelling and analysis of other dynamic systems. It should also be of interest to the concerned citizen who is interested in the foundations for defense analysis and has the appropriate technical background. (Author)

AD-A090 956/4 PC **A18**/MF **A01**
Washington Headquarters Services (DOD), DC. Directorate for Information Operations and Reports.
HERBS Tape.
Feb 74, 424p

This document is a compilation of defoliation missions carried out in Viet Nam during the United States involvement in the hostilities.

AD-A090 982/0 PC **A02**/MF **A01**
Foreign Technology Div., Wright-Patterson AFB, OH.
Force of Weaponry, Multiplied by Spirit Strength,
K. Amirov. 7 Sep 79, 24p Rept no. FTD-ID(RS)T-1262-79
Unedited machine trans. of Kommunist Vooruzhennykh Sil (USSR) n10 p47-52 May 69.

No abstract available.

AD-A091 056/2 PC **A05**/MF **A01**
Naval Postgraduate School, Monterey, CA.
A Survey of Approaches to the Modeling of Land Combat.
Master's thesis,
William Ted Farmer. Jun 80, 77p

This thesis surveys various methods for modeling land combat and examines the assumptions underlying each method. The users of land combat models are identified according to the nature of the problems that they are trying to solve: weapons system life-cycle management, tactical planning and doctrine, force structuring, education and training, and research and methodology. The distinction between models the modeling process is made and some of its consequences explored. A survey of modeling methodologies is presented: it includes high-resolution Monte Carlo simulations, lanchester-type models, analytical models, manual war games, firepower scores models, the hierarchy of models concept, and the Quantified Judgment Method of Analysis. Finally, a basic reading list on models is provided for the beginning military operations research analyst. (Author)

AD-A091 095/0 PC **A09**/MF **A01**
Naval Postgraduate School, Monterey, CA.
A Method for Evaluation of Microcomputers for Tactical Applications.
Master's thesis,
Marcos Mastrakas. Jun 80, 190p

A method is proposed to evaluate the performance of microcomputer systems in a specified tactical application. The computational requirements of a tactical application are specified in terms of performance parameters. The presently marketed microcomputer and multi-microcomputer systems computational performance capacities are also specified in terms of performance parameters. If the performance capacity is not less than the performance requirement, then the microcomputer system is evaluated as a feasible system suitable for implementing the tactical application. A case study using the attack aircraft A6-E tactical system illustrates the evaluation method. (Author)

AD-A091 289/9 PC **A02**/MF **A01**
Army Combined Arms Studies and Analysis Activity, Fort Leavenworth, KS.

CACDA JIFFY III War Game. Volume I. Executive Summary.
Final rept.,
Channing L. Pao, and Robert J. Schwabauer.
Sep 80, 23p Rept no. CASAA-TR-5-80
See also Volume 2, AD-A091 290 and Rept. nos. CASAA-TR-2-77, CASAA-TR-3-77 and CASAA-TR-4-77.

This report is one of a set of five volumes produced to document the combat assessment methodologies and automated features of the Combined Arms Combat Developments Activity (CACDA) Jiffy III war gaming process. The Jiffy process was originally developed to support the TRADOC Scenario Oriented Recurring Evaluation System (SCORES) scenario development and force evaluation efforts. In 1978, the 1977 version of the Jiffy was extensively modified and improved to support Europe III scenario gaming through March 1980. This report documents the Jiffy model used for that gaming. Volume II of this report contains the methodologies used in the automated routines of the Jiffy III Game. An unclassified data base, which was developed for test and demonstration purposes, is presented in Volume II. The classified data used in the Jiffy III Game during secure production runs, and their sources, are published separately as Volume III to keep the methodology volume unclassified. The other three volumes in the set are the Executive Summary (Volume I), the Users Manual (Volume IV), and the Programmers Manual (Volume V). (Author)

AD-A091 290/7 PC **A07**/MF **A01**
Army Combined Arms Studies and Analysis Activity, Fort Leavenworth, KS.
CACDA JIFFY III War Game. Volume II. Methodology.
Final rept.,
Channing L. Pao, Robert J. Schwabauer, Sandra Elliot, James H. Kennington, and William D. Relph. Sep 80, 140p Rept no. CASAA-TR-6-80
See also volume 4, AD-A091 291 and Rept. nos. CASAA-TR-2, CASAA-TR-3-77 and CASAA-TR-4-77.

This report is one of a set of five volumes produced to document the combat assessment methodologies and automated features of the Combined Arms Combat Development Activity (CACDA) JIFFY III war gaming process, developed to support TRADOC SCORES scenario development and force evaluation efforts. This report contains the methodologies used in the automated routines of the JIFFY III game and their unclassified data base.

AD-A091 291/5 PC **A06**/MF **A01**
Army Combined Arms Studies and Analysis Activity, Fort Leavenworth, KS.
CACDA JIFFY III War Game. Volume IV. User's Manual.
Final rept.,
Channing L. Pao, Robert J. Schwabauer, Timothy J. Bailey, James H. Kennington, and William D. Relph. Sep 80, 106p Rept no. CASAA-TR-8-80
See also Volume 2, AD-A091 290 and Rept. nos. CASAA-TR-2-77, CASAA-TR-3-77, and CASAA-TR-4-77.

This report is one of a set of five volumes produced to document the combat assessment methodologies and automated features of the Combined Arms Combat Development Activity (CACDA) JIFFY III war gaming process, developed to support TRADOC SCORES scenario development and force evaluation efforts. This report provides a concise explanation of how to game JIFFY. The automated features of the gaming process and the gamers interface are exemplified through a sample run.

AD-385 637 PC **A06**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Operation Junction City - HQ, 173D Airborne Brigade (Separate).
Combat after action rept. 22 Feb-13 Apr 67 on Phases 1 and 2.
15 Jun 67, 120p OACSFOR-OT-RD-67X001
Distribution limitation now removed.

Due to the length of Operation JUNCTION CITY, and the fact that the operation was conducted in two distinct phases (JUNCTION CITY I and JUNCTION CITY II), this report is divided into two sections. The first phase covers the planning, staging and execution of the parachute assault, and the inclusive dates 22 February through 15 March 1967. The second phase of this report (JUNCTION CITY II), covers operations in the MINH THANH Region of WAR ZONE 'C', 20 March through 13 April, whereupon the 173d Airborne Brigade's role in the operation was terminated.

AD-385 638 PC **A06**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Operation SAM Houston Conducted by the 4TH Infantry Division.
Combat after action rept. 1 Jan-5 Apr 67.
16 May 67, 123p OACSFOR-OT-RD-67X030
Distribution limitation now removed.

Operation SAM HOUSTON started on 1 January 1967, but did not really get going until the division crossed the NAM SATHAY River in mid February. Then in the next five weeks, the division had nine major contacts and a small number of contacts with NVA squad or platoon sized elements. It is significant to note that in each major contact, enemy tactics were of the same pattern. He located the battalion fire bases and kept them under constant surveillance. When the rifle companies moved out on patrol, the enemy would keep track of their movements through the use of small reconnaissance parties or trail watchers. His favorite tactic involved a procedure of reporting movements back and, at a time and location of his choosing, attempting to engage a rifle company while it was moving. He would close quickly with the elements of the company before supporting fires could be effectively employed. He would simultaneously attempt to surround the entire company and fragment it into smaller platoon sized pieces using his favorite weapons, mortars and large numbers of snipers in the trees. His mortars were countered with artillery and air and his snipers by small arms, automatic weapons and particularly the M-79 grenade launcher.

AD-385 750 PC **A03**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Operation Ft. Nisqually, Conducted by 3RD Brigade,4TH Infantry Division.
Combat after action rept.
6 Jun 67, 28p OACSFOR-OT-RD-67X011
Distribution limitation now removed.

No abstract available.

AD-385 751 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Operation Kahala, Headquarters, 2D Brigade,25TH Infantry Division.
Combat after-action rept.,
L. M. Johnson. 14 May 66, 18p OACSFOR-OT-RD-66X117
Distribution limitation now removed.

No abstract available.

AD-385 752 PC **A05**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Combat after Action Report - Operation Billings, Conducted by 1ST Infantry Division.
26 Jul 67, 86p OACSFOR-OT-RD-67X010
Distribution limitation now removed.

Operation BILLINGS was a 1st Infantry Division controlled operation. The operation was conducted against VC/NVA forces and installations in an area extending east from the SONG BE River to Route 1A and from PHUOC VINH north to Highway 13 lateral. The operation was the first conducted by the 1st Infantry Division in War Zone D. During the operation, elements of the 271st VC Regiment were fought and defeated on two occasions. The general area of the operation is described.

AD-385 753 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Operation Aurora I, Headquarters, 173D Airborne Brigade (Separate).
Combat operations after action rept.,
Paul F. Smith. 15 Sep 66, 24p OACSFOR-OT-RD-66X017
Distribution limitation now removed.

No abstract available.

AD-385 754 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Operation Gatling I and II, Headquarters, 1ST Brigade101st Airborne Division.
Combat operations after action rept.
S. H. Matheson. Mar 67, 25p OACSFOR-OT-RD-67X028
Distribution limitation now removed.

No abstract available.

AD-385 755 PC **A03**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Operation Benton, Conducted by 1ST Brigade,101ST Airborne Division,
Combat after action rept.,
Salve H. Matheson. 28 Sep 67, 48p OACSFOR-OT-RD-67X061
Distribution limitation now removed.

No abstract available.

AD-385 756 PC **A06**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Operational Report on Lessons Learned for Period Ending 30 April 1966 (Rcs Csgpo-28(Ri)), Headquarters, 1ST Logistical Command.
2 Jun 66, 108p OACSFOR-OT-RD-660108
Distribution limitation now removed.

No abstract available.

AD-385 757 PC **A03**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Operational Report for Quarterly Period Ending 31 July 1966, Headquarters, 12TH Combat Aviation Group.
15 Aug 66, 38p OACSFOR-OT-RD-660151
Distribution limitation now removed.

The 12th Combat Aviation Group provided Army Aviation support to CG, II FFORCEV, Senior Advisor III ARVN Corps and Senior Advisor IV Corps TZ. At the direction of CG, II FFORCEV, provided support to US, RVN and FWMAF Forces in III CTZ. The unit provided Army Aviation Support forces as directed by COMUSMACV for support of US, RVN and FWMAF Forces in IV CTZ. The unit commanded and administered assigned and attached Army Aviation and Support units (less OPCOM, where specified).

AD-385 838 PC **A07**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Operational Report for Quarterly Period Ending 31 October 1966 (Rcs Csfor-65, Headquarters, 1ST Logistical Command.
27 Nov 66, 132p OACSFOR-OT-RD-660485
Distribution limitation now removed.

No abstract available.

AD-386 116 PC **A04**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Operation Winchesterby the 173D Airborne Brigade (Separate).
Combat after action rept. 8 Oct-4 Dec 66.
19 Jun 67, 74p OACSFOR-OT-RD-67X089
Distribution limitation now removed.

This document is a Combat After Action Report for Operation WINCHESTER. Operation WINCHESTER was conducted by the 173D Airborne Brigade (Separate) during the period 8 October - 4 December 1966. Information contained in this report is provided to insure appropriate benefits in the future from lessons learned during current operations, and may be adapted for use in developing training material.

AD-386 118 PC **A04**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Operation Mastiff, from 1ST Infantry Division.
Combat after-action rept.
21 Dec 66, 71p OACSFOR-OT-RD-66X170
Distribution limitation now removed.

On 210645H February 1966, MACV directed Operation MASTIFF commenced under control of the 1st Infantry Division. The two brigade (reinf) operation was launched to locate and destroy VC forces and base camps in the vicinity of the MICHELIN Rubber Planation. The plan required two

brigades to operate in assigned zones to destroy VC forces which were trapped by the SAIGON River to their rear. A forward division artillery fire support base would be established in the vicinity of RUNG CAY. The operation would be conducted in four phases, incorporating movements of assault units by helicopter and tactical motor convoys to the area of operations.

AD-386 119 PC **A03**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Operation Lanikai/Search and Destroy and Pacification. 4TH Battalion, 23D Infantry,25TH Infantry Division.
Combat operations after action rept.
18 Dec 66, 37p OACSFOR-OT-RD-66X231
Distribution limitation now removed.

No abstract available.

AD-386 121 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Operation Lexington III. Headquarters First Battalion,18TH Infantry.
Combat after action rept.
20 Jun 66, 19p OACSFOR-OT-RD-66X151
Distribution limitation now removed.

No abstract available.

AD-386 128 PC **A04**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Operation Seward, Headquarters 1ST Brigade101st Airborne Division.
Combat operations after action rept. 5 Sep-25 Oct 66
6 Nov 66, 63p OACSFOR-OT-RD-66X201
Distribution limitation now removed.

Operation SEWARD was characterized by counterguerrilla tactics, primarily encompassing small unit actions and frequent contact with small enemy forces. The search and destroy tactics utilized consisted of saturation patrolling, night movement, night ambushes, raids and the use of small unit stay behind forces and small unit immediate action forces. The terrain over which operations were conducted included mountainous jungles, rolling hills, dry and inundated rice paddies, sand dunes and beaches.

AD-387 089 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 62D Maintenance Battalion (Ds).
Operational rept. for quarterly period ending 31 Jan 67.
15 Feb 67, 14p OACSFOR-OT-RD-670176
Distribution limitation now removed.

No abstract available.

AD-387 090 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 63RD Maintenance Battalion (Ds).
Operational rept. for quarterly period ending 31 Jan 67.
10 Feb 67, 13p OACSFOR-OT-RD-670179
Distribution limitation now removed.

No abstract available.

AD-387 091 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 6TH Psychological Operations Battalion.
Operational rept. for quarterly period ending 31 Jan 67.
27 Feb 67, 17p OACSFOR-OT-RD-670182
Distribution limitation now removed.

No abstract available.

AD-387 092 PC **A03**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 1ST Signal Brigade (Usastratcom).
Operational rept. for quarterly period ending 30 Apr 67.
14 May 67, 40p OACSFOR-OT-RD-670378
Distribution limitation now removed.

During the period of this report, the 1st Signal Brigade continued the installation, operation and maintenance of communications-electronics facilities in support of US Forces, governmental agencies, Free World Forces and the Republic of Vietnam and Thailand; and the operation and installation of long haul communication facilities in the Brigade's area of responsibility. The Brigade was operational throughout the period.

AD-387 093 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 2D Maintenance Battalion (Ds).
Operational rept. for quarterly period ending 30 Apr 67.
1 May 67, 23p OACSFOR-OT-RD-670408
Distribution limitation now removed.

No abstract available.

AD-387 094 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 610TH Maintenance Battalion (Ds).
Operational rept. for quarterly period ending 30 Apr 67.
2 Jun 67, 19p OACSFOR-OT-RD-670413
Distribution limitation now removed.

No abstract available.

AD-387 095 PC **A03**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 6TH Psychological Operations Battalion.
Operational rept. for quarterly period ending 30 Apr 67.
19 May 67, 27p OACSFOR-OT-RD-670415
Distribution limitation now removed.

No abstract available.

AD-387 096 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 62D Maintenance Battalion (Ds).
Operational rept. for quarterly period ending 31 Jul 67.
8 Aug 67, 16p OACSFOR-OT-RD-670554
Distribution limitation now removed.

No abstract available.

AD-387 097 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 63D Maintenance Battalion (Ds).
Operational rept. for quarterly period ending 30 Apr 67.
10 May 67, 21p OACSFOR-OT-RD-670629
Distribution limitation now removed.

No abstract available.

AD-387 145 PC **A09**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 1ST Infantry Division.
Operational rept. for quarterly period ending 31 Jul 67.
18 Jan 68, 193p OACSFOR-OT-RD-670742
Distribution limitation now removed.

During this period the 1st Infantry Division continued to conduct combat operations designed to locate and destroy Viet Cong (VC) and North Vietnamese Army (NVA) forces and installations in the III Corps Tactical Zone (CTZ). Operation MANHATTAN continued into this quarter with a large arms cache and substantial amounts of enemy supplies being captured or destroyed. Operation DALLAS took place in an area east of Highway 16, from the SONG BE River south toward TAN UYEN. The significant aspect of this operation was the destruction of the VINH LOI Woods. There were no major contacts with the enemy during the operation.

AD-387 282 PC **A05**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, II Field Force Vietnam.
Operational rept. for quarterly period ending 31 Jul 67.
18 Sep 67, 78p OACSFOR-OT-RD-670584
Distribution limitation now removed.

No abstract available.

AD-387 285 PC **A03**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 1ST Brigade,101ST Airborne Division.
Operational rept. for quarterly period ending 31 Jul 67.
31 Jul 67, 43p OACSFOR-OT-RD-670577
Distribution limitation now removed.

No abstract available.

AD-387 286 PC **A03**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, Tuy Hoa Subarea Command.
Operational rept. for quarterly period ending 31 Oct 67.
12 Feb 68, 26p OACSFOR-OT-RD-674139
Distribution limitation now removed.

No abstract available.

AD-387 322 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 1ST Military Intelligence Battalion (Ars).
Operational rept. for quarterly period ending 31 Oct 67.
14 Feb 68, 22p OACSFOR-OT-RD-T674253
Distribution limitation now removed.

The primary mission, that of providing tactical interpretation, reproduction, and aerial delivery of imagery and related materials resulting from tactical air reconnaissance operations within the Republic of Vietnam, was successfully accomplished during the reporting period. Support has been rendered to ARVN, ROK, Australian, and Thai units, as well as to US ground, air, and naval elements throughout the four Corps Tactical Zones.

AD-387 328 PC **A09**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, United States Army Vietnam.
Operational rept. for period ending 31 Oct 67.
12 Feb 68, 187p OACSFOR-OT-RD-T674275
Distribution limitation now removed.

No abstract available.

AD-387 362 PC **A04**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 196TH Light Infantry Brigade.
Operational rept. for quarterly period ending 30 Jul 67.
22 Sep 67, 57p OACSFOR-OT-RD-670772
Distribution limitation now removed.

No abstract available.

AD-387 363 PC **A05**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 3D Brigade,25TH Infantry Division.
Operational rept. for quarterly period ending 31 Jul 67.
10 Aug 67, 87p OACSFOR-OT-RD-670701
Distribution limitation now removed.

No abstract available.

AD-387 364 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Combat after Action Report - Battle of Doi Ma Creek, 3D Brigade,9TH Infantry Division,
21 Apr 67, 8p OACSFOR-OT-RD-67X148
Distribution limitation now removed.

No abstract available.

AD-387 365 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 21ST Signal Group.
Operational rept. for quarterly period ending 31 Jan 67.

12 Feb 67, 19p OACSFOR-OT-RD-670123
Distribution limitation now removed.

No abstract available.

AD-387 366 PC **A04**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 2D Signal Group.
Operational rept. for quarterly period ending 31 Oct 66.
13 Feb 67, 56p OACSFOR-OT-RD-660422
Distribution limitation now removed.

No abstract available.

AD-387 367 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 39TH Signal Battalion (Spt).
Operational rept. for quarterly period ending 31 Jan 67.
14 Feb 67, 17p OACSFOR-OT-RD-670126
Distribution limitation now removed.

No abstract available.

AD-387 368 PC **A03**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 73RD Signal Battalion (Spt).
Operational rept. for quarterly period ending 31 Oct 66.
13 Nov 66, 30p OACSFOR-OT-RD-660430
Distribution limitation now removed.

No abstract available.

AD-387 369 PC **A05**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 54TH Signal Battalion (Corps).
Operational rept. for period ending Apr 66.
14 May 66, 98p OACSFOR-OT-RD-660079
Distribution limitation now removed.

No abstract available.

AD-387 370 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 43D Signal Battalion (Support).
Operational rept. for quarterly period ending 30 Apr 67.
15 May 67, 18p OACSFOR-OT-RD-670363
Distribution limitation now removed.

No abstract available.

AD-387 399 PC **A03**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 2D Battalion94th Artillery.
Operational rept. for quarterly period ending 31 Oct 67.
7 Nov 67, 26p OACSFOR-OT-RD-674187
Distribution limitation now removed.

No abstract available.

AD-387 472 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 7TH Battalion,9TH Artillery.
Operational rept. for quarterly period ending 31 Oct 67.
1 Nov 67, 16p OACSFOR-OT-RD-674180
Distribution limitation now removed.

No abstract available.

AD-387 477 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 1ST Battalion,30TH Artillery.
Operational rept. for quarterly period ending 31 Oct 67.
5 Nov 67, 13p OACSFOR-OT-RD-674195
Distribution limitation now removed.

No abstract available.

AD-387 505 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, II Field Force Vietnam Artillery.
Operational rept. for quarterly period ending 31 Oct 67.
15 Nov 67, 19p OACSFOR-OT-RD-674186
Distribution limitation now removed.

No abstract available.

AD-387 506 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 1ST Aviation Brigade.
Operational rept. for quarterly period ending 31 Oct 67.
14 Nov 67, 23p OACSFOR-OT-RD-T674254
Distribution limitation now removed.

No abstract available.

AD-387 514 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Operation Hoptac XVI, 2D Brigade,9TH Infantry Division.
Combat after action rept.,
William B. Fulton. 16 Jun 68, 12p OACSFOR-OT-RD-67X115
Distribution limitation now removed.

No abstract available.

AD-387 515 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 7TH Battalion,8TH Artillery.
Operational rept. for quarterly period ending 31 Oct 67.
1 Nov 67, 21p OACSFOR-OT-RD-674182
Distribution limitation now removed.

No abstract available.

AD-387 516 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 1ST Battalion (Aw) (Sp),44TH Artillery.
Operational rept. for quarterly period ending 31 Oct 67.
1 Nov 67, 19p OACSFOR-OT-RD-674191
Distribution limitation now removed.

No abstract available.

AD-387 517 PC **A03**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 6TH Psychological Operations Battalion.
Operational rept. for quarterly period ending 31 Oct 67.
15 Nov 67, 26p OACSFOR-OT-RD-T674235
Distribution limitation now removed.

No abstract available.

AD-387 518 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 88TH Supply and Service Battalion (Ds).
Operational rept. for quarterly period ending 31 Oct 67.
9 Nov 67, 15p OACSFOR-OT-RD-674027
Distribution limitation now removed.

No abstract available.

AD-387 519 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 6TH Battalion,14TH Artillery.
Operational rept. for quarterly period ending 31 Oct 67.
1 Nov 67, 20p OACSFOR-OT-RD-674198
Distribution limitation now removed.

No abstract available.

AD-387 535 PC **A03**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 10TH Combat Aviation Battalion.
Operational rept. for quarterly period ending 31 Oct 67.
15 Nov 67, 38p OACSFOR-OT-RD-674061
Distribution limitation now removed.

No abstract available.

AD-387 536 PC **A04**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 2D Signal Group.
Operational rept. for quarterly period ending 31 Oct 67.
12 Nov 67, 60p OACSFOR-OT-RD-674184
Distribution limitation now removed.

No abstract available.

AD-387 537 PC **A04**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 196TH Light Infantry Brigade.
Operational rept. for quarterly period ending 31 Oct 67.
10 Nov 67, 53p OACSFOR-OT-RD-674210
Distribution limitation now removed.

No abstract available.

AD-387 538 PC **A03**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 11TH Combat Aviation Battalion.
Operational rept. for quarterly period ending 31 Oct 67.
1 Nov 67, 33p OACSFOR-OT-RD-674134
Distribution limitation now removed.

No abstract available.

AD-387 539 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 1ST Battalion,40TH Artillery.
Operational rept. for quarterly period ending 31 Oct 67.
9 Nov 67, 16p OACSFOR-OT-RD-674192
Distribution limitation now removed.

No abstract available.

AD-387 540 PC **A03**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 18TH Engineer Brigade.
Operational rept. for quarterly period ending 31 Oct 67.
31 Oct 67, 38p OACSFOR-OT-RD-T674251
Distribution limitation now removed.

No abstract available.

AD-387 542 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 23D Artillery Group.
Operational rept. for quarterly period ending 31 Oct 67.
10 Nov 67, 20p OACSFOR-OT-RD-674076
Distribution limitation now removed.

No abstract available.

AD-387 543 PC **A04**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 1ST Cavalry Division (Airmobile).
Operational rept. for quarterly period ending 31 Oct 67.
15 Nov 67, 55p OACSFOR-OT-RD-T674236
Distribution limitation now removed.

No abstract available.

AD-387 571 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 191ST Ordnance Battalion.
Operational rept. for quarterly period ending 31 Oct 67.
3 Nov 67, 16p OACSFOR-OT-RD-674024
Distribution limitation now removed.

No abstract available.

AD-387 572 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.

Lessons Learned, Headquarters, 17TH Combat Aviation Group.
Operational rept. for quarterly period ending 31 Oct 67.
17 Nov 67, 22p OACSFOR-OT-RD-674185
Distribution limitation now removed.

No abstract available.

AD-387 573 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 9TH Logistical Command.
Operational rept. for quarterly period ending 31 Oct 67.
30 Nov 67, 18p OACSFOR-OT-RD-674208
Distribution limitation now removed.

No abstract available.

AD-387 574 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 1ST Battalion,27TH Artillery,
Operational rept. for quarterly period ending 31 Oct 67.
4 Nov 67, 15p OACSFOR-OT-RD-674158
Distribution limitation now removed.

No abstract available.

AD-387 599 PC **A07**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Operation Abilene, Headquarters, 1ST Infantry Division.
Combat operations after action rept. for period ending Apr 66.
Apr 66, 147p OACSFOR-OT-RD-66X001
Distribution limitation now removed.

No abstract available.

AD-387 601 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Operation Ahina, Conducted by the 25TH Infantry Division.
Combat after action rept. for period ending 18 May 67.
16 Jul 67, 19p OACSFOR-OT-RD-67X003
Distribution limitation now removed.

No abstract available.

AD-387 602 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Operation Attleboro, Headquarters, 173D Airborne Brigade (Separate),
Combat operations after action rept. for period ending 20 Nov 66.
30 Dec 66, 22p OACSFOR-OT-RD-66X009
Original contains color plates: all DDC reproductions will be in black and white. Original may be seen in DDC Headquarters.
Distribution limitation now removed.

No abstract available.

AD-387 603 PC **A03**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Operation Atlantic City, Headquarters, 173D Airborne Brigade (Separate).
Combat operations after action rept. for period ending 22 Sep 66.
15 Dec 66, 30p OACSFOR-OT-RD-66X016
Distribution limitation now removed.

No abstract available.

AD-387 604 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Aurora II,Headquarters, 173D Airborne Brigade (Separate).
Combat operations after action rept. for period ending 3 Aug 66.
15 Sep 66, 22p OACSFOR-OT-RD-66X018
Distribution limitation now removed.

No abstract available.

AD-387 606 PC **A12**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Operation El Paso II/III, Headquarters, 1ST Infantry Division.
Combat after action rept. 2 Jun-3 Sep 66.
8 Dec 66, 252p OACSFOR-OT-RD-66X043
Microfiche only after original copies exhausted.
Distribution limitation now removed.

No abstract available.

AD-387 607 PC **A03**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Operation Hickory, Headquarters, 3D Squadron,11TH Armored Cavalry Regiment.
Combat operations after action rept. for period ending 30 Oct 66.
30 Oct 66, 27p OACSFOR-OT-RD-66X107
Distribution limitation now removed.

No abstract available.

AD-387 608 PC **A03**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Operation Pickett, Headquarters, 1ST Brigade,101ST Airborne Division.
Combat operations after action rept. for period ending 19 Jan 67.
15 Feb 67, 37p OACSFOR-OT-RD-66X180
Distribution limitation now removed.

No abstract available.

AD-387 609 PC **A03**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Operation Sioux City, Headquarters, 173D Airborne Brigade (Separate).
Combat after action rept. for period ending 9 Oct 66.
15 Dec 66, 39p OACSFOR-OT-RD-66X203
Distribution limitation now removed.

No abstract available.

AD-387 610 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Operation Sante Fe, Headquarters, 1ST Battalion,27TH Infantry.
Combat after action rept. for period ending 4 Jul 66.
20 Jul 66, 21p OACSFOR-OT-RD-66X259
Distribution limitation now removed.

No abstract available.

AD-387 618 PC **A03**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Operation Attleboro, 2D Brigade,25TH Infantry Division.
Combat after action rept.
Nov 66, 43p OACSFOR-OT-RD-66X011
Distribution limitation now removed.

No abstract available.

AD-387 619 PC **A03**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Operation Attleboro, Headquarters, 25TH Infantry Division.
Combat operations after action rept. for period ending 25 Nov 66.
Dec 66, 44p OACSFOR-OT-RD-66X012
Distribution limitation now removed.

No abstract available.

AD-387 620 PC **A04**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, Operation Atlanta, 11TH Armored Cavalry Regiment.
Combat after action rept.
14 Mar 67, 61p OACSFOR-OT-RD-66X014
Distribution limitation now removed.

No abstract available.

AD-387 621 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Cai Be Ambush,Headquarters, Senior Advisor, Advisory Team 96,
Combat after action rept.,
Sidney B. Berry, Jr. 12 Feb 66, 14p OACSFOR-OT-RD-66X047
Distribution limitation now removed.

No abstract available.

AD-387 622 PC **A12**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Operation Birmingham, Headquarters, 1ST Infantry Division.
Combat operations after action rept. for period ending May 66.
Jun 66, 261p OACSFOR-OT-RD-66x232
Distribution limitation now removed.

On 24 April 1966, MACV directed Operation BIRMINGHAM commenced under control of the 1st Infantry Division. Division OPORD 8-66, dated 19 April 1966, specified that the operation was to be conducted in TAY NINH Province. The area was bounded on the west and north by the CAMBODIAN Border, on the south by the SONG VAM CO River and TAY NINH City and on the east by the 40 N - S grid line (Annex A, Operation Overlay). The two brigade (reinf) operation was launched to locate and destroy VC forces and base camps in the area of operations. Two reinforced brigades operated in assigned areas, and moved rapidly to successive areas by helicopter to exploit new intelligence on VC troop and supply installations. Planning was continuous and orders were issued for operations in new areas as the situation developed.

AD-387 623 PC **A03**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 2D Battalion,27TH Infantry (The Wolfhounds)(Operation Attleboro).
Combat operations after action rept. for period ending 24 Nov 66.
24 Nov 66, 31p OACSFOR-OT-RD-66X235
Distribution limitation now removed.

No abstract available.

AD-387 624 PC **A04**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Operation Blackjack 34, 41, 41C and 42.
Combat after action rept. for period ending 31 Jul 67.
31 Jul 67, 52p OACSFOR-OT-RD-67X080
Distribution limitation now removed.

No abstract available.

AD-387 626 PC **A06**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Operation Greeley, Headquarters, 4TH Infantry Division.
Combat operations after action rept. for period ending 11 Oct 67,
W. R. Peers. 16 Dec 67, 109p OACSFOR-OT-RD-67X117
Distribution limitation now removed.

No abstract available.

AD-387 627 PC **A11**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Operation Francis Marion.
Combat operations after action rept. for period ending 11 Oct 67.
25 Nov 67, 235p OACSFOR-OT-RD-67X112
Distribution limitation now removed.

No abstract available.

AD-387 630 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 2D Battalion,11TH Artillery.
Operational rept. for quarterly period ending 31 Oct 67.
8 Nov 67, 18p OACSFOR-OT-RD-674007
Distribution limitation now removed.

No abstract available.

AD-387 631 PC **A03**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 222D Aviation Battalion.
Operational rept. for quarterly period ending 31 Oct 67.
15 Nov 67, 31p OACSFOR-OT-RD-674110
Distribution limitation now removed.

No abstract available.

AD-387 632 PC **A03**/MF **A01**
Adjutant General's Office (Army), Washington, DC.

Lessons Learned, Headquarters, US Army Engineer Command (Prov).
Operational rept. for quarterly period ending 31 Jul 67.
31 Jul 67, 29p OACSFOR-OT-RD-T670803
Distribution limitation now removed.

No abstract available.

AD-387 683 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, Americal Division Support Command.
Operational rept. for quarterly period ending 31 Oct 67.
13 Nov 67, 18p OACSFOR-OT-RD-T674261
Distribution limitation now removed.

No abstract available.

AD-387 684 PC **A03**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 11TH Armored Cavalry Regiment.
Operational rept. for quarterly period ending 31 Jul 67.
31 Jul 67, 48p OACSFOR-OT-RD-670833
Distribution limitation now removed.

No abstract available.

AD-387 685 PC **A03**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 4TH Battalion,60TH Artillery.
Operational rept. for quarterly period ending 31 Oct 67.
31 Oct 67, 36p OACSFOR-OT-RD-674190
Distribution limitation now removed.

No abstract available.

AD-387 801 PC **A05**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, Task Force Oregon(Americal Division).
Operational rept. for quarterly period ending 31 Jul 67.
5 Nov 67, 83p OACSFOR-OT-RD-670570
Distribution limitation now removed.

No abstract available.

AD-387 936 PC **A04**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, I Field Force Vietnam.
Operational rept. for quarterly period ending 31 Oct 67.
15 Nov 67, 61p OACSFOR-OT-RD-674078
Distribution limitation now removed.

No abstract available.

AD-388 133 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Combat Operations after Action Report.
15 Sep 66, 17p OACSFOR-OT-RD-66X038
Distribution limitation now removed.

No abstract available.

AD-388 134 PC **A04**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Headquarters, 173D Airborne Brigade (Separate), Operation 'Crimp'.
Combat operations after action rept.
23 Feb 66, 58p OACSFOR-OT-RD-66X181
Distribution limitation now removed.

On 8 January 1966 the 173d Abn Bde (Sep) terminated a successful Operation MARAUDER along the Oriental River in the Hau Nghia Province and moved directly into the largest U.S. operation thus far conducted in Vietnam. CRIMP, as the operation was named, was a massive attack by air and land to strike at the very heart of the Viet Cong machine in Southern RVN. The notorious HOBO WOODS Region in Binh Duong Province, just West of the fabled IRON TRIANGLE was believed to hold the Politico-Military headquarters of the Viet Cong Military Region 4. The objective of Operation CRIMP was to find and destroy or capture all personnel, equipment, and intelligence material of this headquarters.

AD-388 135 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Operation Robin,Headquarters, 173RD Airborne Brigade (Separate).
Combat after action rept. for period ending 17 Oct 66.
15 Dec 66, 23p OACSFOR-OT-RD-66X190
Distribution limitation now removed.

No abstract available.

AD-388 136 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Operation Waco Conducted by Headquarters, 173D Airborne Brigade (Separate).
Combat after action rept. for period ending 21 Dec 66.
2 Jan 67, 24p OACSFOR-OT-RD-66X211
Distribution limitation now removed.

No abstract available.

AD-388 137 PC **A04**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Operation Junction City II,Conducted by the Headquarters, 11TH Armored Cavalry Regiment.
Combat after action rept. for period ending 15 Apr 67.
9 Aug 67, 54p OACSFOR-OT-RD-67X002
Distribution limitation now removed.

No abstract available.

AD-388 138 PC **A05**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Operation Dallas,Conducted by Headquarters, 1ST Infantry Division.
Combat after action rept. for period ending 25 May 67.
28 Jun 67, 83p OACSFOR-OT-RD-67X008
Distribution limitation now removed.

No abstract available.

AD-388 139 PC **A03**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Operation Dazziem Conducted by the Headquarters, 1ST Cavalry Division (Am).
Combat after action rept. for period ending 10 Apr 67.
26 Jul 67, 42p OACSFOR-OT-RD-67X012
Distribution limitation now removed.

No abstract available.

AD-388 140 PC **A04**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Operation Junction City,Conducted by the Headquarters, 3D Brigade,4TH Infantry Division.
Combat after action rept. for period ending 10 Apr 67.
12 May 67, 56p OACSFOR-OT-RD-67X014
Distribution limitation now removed.

No abstract available.

AD-388 141 PC **A03**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Operation Farragut Conducted by Headquarters, 1ST Brigade,101ST Airborne Division.
Combat after action rept. for period ending 23 Mar 67.
3 May 67, 40p OACSFOR-OT-RD-67X027
Distribution limitation now removed.

No abstract available.

AD-388 150 PC **A05**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters II Field Force Vietnam.
Operational rept. for quarterly period ending 30 Apr 66.
1 Jun 66, 100p OACSFOR-OT-RD-660124
Distribution limitation now removed.

No abstract available.

AD-388 151 PC **A04**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, II Field Force Vietnam.
Operational rept. for quarterly period ending 31 Jul 66.
15 Aug 66, 73p OACSFOR-OT-RD-660290
Distribution limitation now removed.

No abstract available.

AD-388 152 PC **A03**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 173D Airborne Brigade (Separate).
Operational rept. for quarterly period ending 31 Jul 66.
15 Oct 66, 31p OACSFOR-OT-RD-660297
Distribution limitation now removed.

No abstract available.

AD-388 154 PC **A04**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Operation Junction City, Conducted by Headquarters, 11TH Armored Cavalry Regiment.
Combat after action rept. for period ending 16 Mar 67.
15 Nov 67, 56p OACSFOR-OT-RD-67X059
Distribution limitation now removed.

No abstract available.

AD-388 155 PC **A03**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 29TH General Support Group.
Operational rept. for quarterly period ending 31 Jan 67.
15 Feb 67, 35p OACSFOR-OT-RD-670214
Distribution limitation now removed.

No abstract available.

AD-388 156 PC **A06**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 1ST Cavalry Division (Airmobile).
Operational rept. for quarterly period ending 31 Jan 67.
15 Feb 67, 103p OACSFOR-OT-RD-670226
Distribution limitation now removed.

No abstract available.

AD-388 157 PC **A06**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, II Field Force Vietnam.
Operational rept. for quarterly period ending 31 Jan 67.
15 Feb 67, 111p OACSFOR-OT-RD-670228
Distribution limitation now removed.

No abstract available.

AD-388 158 PC **A04**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, 1ST Brigade,4TH Infantry Division.
Operational rept. for quarterly period ending 31 Jan 67.
1 Feb 67, 72p OACSFOR-OT-RD-670230
Distribution limitation now removed.

No abstract available.

AD-388 159 PC **A04**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 4TH Infantry Division.
Operational rept. for quarterly period ending 31 Jan 67.
20 Mar 67, 56p OACSFOR-OT-RD-670232
Distribution limitation now removed.

No abstract available.

AD-388 160 PC **A03**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 29TH General Support Group.
Operational rept. for quarterly period ending 30 Apr 67.
15 May 67, 28p OACSFOR-OT-RD-670440

Distribution limitation now removed.

No abstract available.

AD-388 161 PC **A03**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 34TH General Support Group (Am and S).
Operational rept. for quarterly period ending 30 Apr 67.
15 May 67, 36p OACSFOR-OT-RD-670441
Distribution limitation now removed.

The group has the mission of providing Army Aircraft Maintenance and Supply Support (Aircraft, Aircraft Repair Parts; Avionics, Aircraft Armament and Aircraft Armor) to United States and other Free World Military Assistance Forces within the Republic of Vietnam.

AD-388 162 PC **A03**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 1ST Brigade,101ST Airborne Division.
Operational rept. for quarterly period ending 30 Apr 67.
30 Apr 67, 44p OACSFOR-OT-RD-670466
Distribution limitation now removed.

No abstract available.

AD-388 163 PC **A06**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 1ST Infantry Division.
Operational rept. for quarterly period ending 30 Apr 67.
30 Apr 67, 120p OACSFOR-OT-RD-670468
Distribution limitation now removed.

No abstract available.

AD-388 164 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 34TH General Support Group (Am and S).
Operational rept. for quarterly period ending 31 Jul 67.
10 Aug 67, 25p OACSFOR-OT-RD-670659
Distribution limitation now removed.

No abstract available.

AD-388 165 PC **A06**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, II Field Force Vietnam.
Operational rept. for quarterly period ending 30 Apr 67.
15 May 67, 112p OACSFOR-OT-RD-670751
Distribution limitation now removed.

No abstract available.

AD-388 166 PC **A04**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, US Army Support Command Cam Ranh Bay.
Operational rept. for quarterly period ending 31 Oct 67.
15 Nov 67, 64p OACSFOR-OT-RD-T674260
Distribution limitation now removed.

No abstract available.

AD-388 271 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 525TH Military Intelligence Group.
Operational rept. for quarterly period ending 31 Jul 66.
11 Aug 66, 19p OACSFOR-OT-RD-660211
Distribution limitation now removed.

No abstract available.

AD-388 272 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 95TH Military Police Battalion.
Operational rept. for quarterly period ending 31 Jul 66.
12 Aug 66, 20p OACSFOR-OT-RD-660215
Distribution limitation now removed.

No abstract available.

AD-388 273 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 68TH Medical Group.
Operational rept. for quarterly period ending 31 Oct 66.
7 Nov 66, 23p OACSFOR-OT-RD-660402
Distribution limitation now removed.

No abstract available.

AD-388 275 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 135TH Military Intelligence Group.
Operational rept. for quarterly period ending 31 Oct 66.
30 Nov 66, 10p OACSFOR-OT-RD-660412
Distribution limitation now removed.

No abstract available.

AD-388 276 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 16TH Military Police Group.
Operational rept. for quarterly period ending 31 Oct 66.
15 Nov 66, 13p OACSFOR-OT-RD-660413
Distribution limitation now removed.

No abstract available.

AD-388 277 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 92D Military Police Battalion.
Operational rept. for quarterly period ending 31 Oct 66.
12 Nov 66, 24p OACSFOR-OT-RD-660415
Distribution limitation now removed.

No abstract available.

AD-388 278 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 16TH Military Police Group.
Operational rept. for quarterly period ending 31 Jan 67.
15 Feb 67, 12p OACSFOR-OT-RD-670109
Distribution limitation now removed.

No abstract available.

AD-388 279 PC **A03**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 18TH Military Police Brigade.
Operational rept. for quarterly period ending 31 Jan 67.
12 Feb 67, 34p OACSFOR-OT-RD-670110
Distribution limitation now removed.

No abstract available.

AD-388 280 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 92D Military Police Battalion.
Operational rept. for quarterly period ending 31 Jan 67.
5 Feb 67, 24p OACSFOR-OT-RD-670111
Distribution limitation now removed.

No abstract available.

AD-388 281 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 97TH Military Police Battalion.
Operational rept. for quarterly period ending 31 Jan 67.
5 Feb 67, 10p OACSFOR-OT-RD-670118
Distribution limitation now removed.

No abstract available.

AD-388 282 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 95TH Military Police Battalion.
Operational rept. for quarterly period ending 30 Apr 67.
14 May 67, 24p OACSFOR-OT-RD-670349
Distribution limitation now removed.

No abstract available.

AD-388 283 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 97TH Military Police Battalion.
Operational rept. for quarterly period ending 30 Apr 67.
12 May 67, 14p OACSFOR-OT-RD-670350
Distribution limitation now removed.

No abstract available.

AD-388 284 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 16TH Military Police Group.
Operational rept. for quarterly period ending 30 Apr 67.
15 May 67, 16p OACSFOR-OT-RD-670355
Distribution limitation now removed.

No abstract available.

AD-388 285 PC **A03**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 18TH Military Police Brigade.
Operational rept. for quarterly period ending 30 Apr 67.
13 May 67, 49p OACSFOR-OT-RD-670357
Distribution limitation now removed.

No abstract available.

AD-388 287 PC **A03**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 18TH Military Police Brigade.
Operational rept. for quarterly period ending 31 Jul 67.
14 Aug 67, 34p OACSFOR-OT-RD-670661
Distribution limitation now removed.

No abstract available.

AD-388 312 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 6TH Battalion,32D Artillery.
Operational rept. for quarterly period ending 31 Oct 67.
5 Nov 67, 20p OACSFOR-OT-RD-674193
Microfiche only after original copies exhausted.
Distribution limitation now removed.

No abstract available.

AD-388 315 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 716TH Military Police Battalion.
Operational rept. for quarterly period ending 31 Oct 67.
13 Nov 67, 19p OACSFOR-OT-RD-674100
Distribution limitation now removed.

During the reporting period, this unit's mission continues to be security and law enforcement in the Saigon/Cholon/Tan Son Nhut metropolitan area, Vietnam. Specific security missions, involving approximately 70% of the military police/security guard resources of the battalion, includes the US Embassy, new MACV Complex, VIP and General's quarters, BOQ's BEQ's, and critical US facilities and installations throughout the city. This security mission is primarily aimed at detering terrorist acts, both overt and covert. The law enforcement mission involves normal military police functions in a metropolitan area, to include criminal investigations. The battalion supports the requirements of the Provost Marshal, US Army Headquarters Area Command, for military police/security guards within the resources available.

AD-388 381 PC **A05**/MF **A01**
Adjutant General's Office (Army), Washington, DC.

Lessons Learned, Headquarters, 25TH Infantry Division.
Operational rept. for quarterly period ending 31 Oct 67.
14 Nov 67, 83p OACSFOR-OT-RD-674216
Distribution limitation now removed.

No abstract available.

AD-388 475 PC **A03**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 145TH Combat Aviation Battalion.
Operational rept. for quarterly period ending 31 Oct 67.
13 Nov 67, 30p OACSFOR-OT-RD-674138
Distribution limitation now removed.

No abstract available.

AD-388 476 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 13TH Combat Aviation (Delta) Battalion.
Operational rept. for quarterly period ending 31 Oct 67.
22 Nov 67, 18p OACSFOR-OT-RD-674140
Distribution limitation now removed.

No abstract available.

AD-388 477 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 41ST Artillery Group.
Operational rept. for quarterly period ending 31 Oct 67.
22 Nov 67, 22p OACSFOR-OT-RD-674203
Distribution limitation now removed.

No abstract available.

AD-388 478 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters Americal Division Artillery.
Operational rept. for quarterly period ending 31 Oct 67.
22 Nov 67, 16p OACSFOR-OT-RD-T674263
Distribution limitation now removed.

No abstract available.

AD-388 576 PC **A04**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, Americal Division.
Operational rept. for quarterly period ending 31 Oct 67.
26 Nov 67, 70p OACSFOR-OT-RD-674289
Distribution limitation now removed.

No abstract available.

AD-388 577 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 16TH Military Police Group.
Operational rept. for quarterly period ending 31 Oct 67.
11 Nov 67, 15p OACSFOR-OT-RD-674014
Microfiche only after original copies exhausted.
Distribution limitation now removed.

No abstract available.

AD-388 578 PC **A03**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 173D Airborne Brigade (Sep).
Operational rept. for quarterly period ending 31 Oct 67.
15 Nov 67, 35p OACSFOR-OT-RD-T674257
Distribution limitation now removed.

No abstract available.

AD-388 679 PC **A03**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 34TH General Support Group (Am and S).
Operational rept. for quarterly period ending 31 Oct 67.
11 Nov 67, 33p OACSFOR-OT-RD-674281
Distribution limitation now removed.

No abstract available.

AD-388 688 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 159TH Transportation Battalion (Terminal).
Operational rept. for quarterly period ending 31 Oct 67.
1 Nov 67, 15p OACSFOR-OT-RD-674294
Microfiche only after original copies exhausted.
Distribution limitation now removed.

No abstract available.

AD-388 747 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 54TH Artillery Group.
Operational rept. for quarterly period ending 31 Oct 67.
5 Dec 67, 20p OACSFOR-OT-RD-674131
Distribution limitation now removed.

No abstract available.

AD-388 748 PC **A03**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 8TH Battalion (175MM) (Sp),4TH Artillery,
Operational rept. for quarterly period ending 31 Oct 67.
1 Nov 67, 26p OACSFOR-OT-RD-674201
Distribution limitation now removed.

No abstract available.

AD-388 749 PC **A04**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 9TH Infantry Division.
Operational rept. for quarterly period ending 31 Oct 67.
23 Dec 67, 68p OACSFOR-OT-RD-T674255
Distribution limitation now removed.

No abstract available.

AD-388 840 PC **A04**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 11TH Armored Cavalry Regiment.
Operational rept. for quarterly period ending 31 Oct 67.
20 Nov 67, 65p OACSFOR-OT-RD-T674248
Distribution limitation now removed.

This Operational Report - Lessons Learned covers the period 1 Aug - 31 Oct 1967 during which the Blackhorse Regiment completed its first year in the Republic of South Vietnam. During this quarter the regiment continued to conduct operations designed to locate and destroy Viet Cong forces and installations within the Blackhorse Tactical Area of Interest (TAOI) and Tactical Area of Responsibility (TAOR). Road clearing operations were continued on all major routes within the TAOI. The road clearing opened lines of communication, allowed the Vietnamese freer use of the roads of Long Khanh Province, and decreased the opportunity for Viet Cong Forces to halt traffic for tax collection. In addition, these clearing operations interdicted a major Viet Cong supply route from the May Tao Secret Zone to the Hat Dich Secret Zone.

AD-388 841 PC **A03**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 5TH Battalion,2D Artillery.
Operational rept. for quarterly period ending 31 Oct 67.
11 Nov 67, 27p OACSFOR-OT-RD-674299
Distribution limitation now removed.

No abstract available.

AD-388 842 PC **A08**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 269TH Combat Aviation Battalion.
Operational rept. for quarterly period ending 31 Oct 67.
1 Nov 67, 153p OACSFOR-OT-RD-674137
Distribution limitation now removed.

No abstract available.

AD-388 843 PC **A04**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 4TH Infantry Division.
Operational rept. for quarterly period ending 31 Oct 67.
26 Dec 67, 72p OACSFOR-OT-RD-674280
Distribution limitation now removed.

No abstract available.

AD-388 844 PC **A03**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 3D Battalion,18TH Artillery.
Operational rept. for quarterly period ending 31 Oct 67.
10 Nov 67, 29p OACSFOR-OT-RD-674004
Distribution limitation now removed.

No abstract available.

AD-388 845 PC **A04**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 1ST Brigade101st Airborne Division.
Operational rept. for quarterly period ending 31 Oct 67.
13 Mar 68, 60p OACSFOR-OT-RD-T674249
Distribution limitation now removed.

No abstract available.

AD-388 846 PC **A04**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 12TH Combat Aviation Group.
Operational rept. for quarterly period ending 31 Oct 67.
11 Nov 67, 52p OACSFOR-OT-RD-674164
Distribution limitation now removed.

The 12th Combat Aviation Group continued to furnish outstanding support to units in the II Field Force Vietnam area. Units within the group continued to exceed the established flying hour program in order to support the heavy operational commitments. During the quarter there was a marked increase in the use of CH-47 aircraft by ground units.

AD-388 847 PC **A03**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 14TH Combat Aviation Battalion.
Operational rept. for quarterly period ending 31 Oct 67.
14 Nov 67, 30p OACSFOR-OT-RD-674058
Distribution limitation now removed.

No abstract available.

AD-388 882 PC **A03**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Operation John Paul Jones, 1ST Brigade,101ST Airborne Division.
Combat after action rept. for quarterly period ending 31 Oct 66.
28 Sep 66, 34p OACSFOR-OT-RD-66X115
Distribution limitation now removed.

No abstract available.

AD-388 883 PC **A07**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Operational Report for Quarterly Period Ending 31 July 1966. Headquarters, 1ST Brigade,101ST Airborne Division.
13 Aug 66, 136p OACSFOR-OT-RD-660296
Distribution limitation now removed.

The Brigade was involved in combat operations during the entire reporting period. Training was conducted concurrently with combat operations during periods when units were refitting and preparing for new phases of operations. The Brigade conducted three administrative moves during the reporting period, and elements of the Brigade were involved in these moves for a total of twenty-two days.

AD-388 884 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 95TH Military Police Battalion.
Operational rept. for quarterly period ending 31 Oct 66.
8 Nov 66, 21p OACSFOR-OT-RD-660417
Distribution limitation now removed.

No abstract available.

AD-388 885 PC **A03**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 196TH Light Infantry Brigade.
Operational rept. for quarterly period ending 31 Oct 66.
29 Nov 66, 48p OACSFOR-OT-RD-660511
Distribution limitation now removed.

No abstract available.

AD-388 886 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 95TH Military Police Battalion.
Operational rept. for quarterly period ending 31 Jan 67.
14 Feb 67, 13p OACSFOR-OT-RD-670113
Distribution limitation now removed.

No abstract available.

AD-388 887 PC **A08**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, HQ, 1ST Logistical Command.
Operational rept. for quarterly period ending 31 Jan 67.
31 Jan 67, 160p OACSFOR-OT-RD-670197
Distribution limitation now removed.

No abstract available.

AD-388 888 PC **A03**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, HQ, 196TH Light Infantry Brigade.
Operational rept. for quarterly period ending 31 Jan 67.
7 Mar 67, 41p OACSFOR-OT-RD-670221
Distribution limitation now removed.

No abstract available.

AD-388 889 PC **A05**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, HQ, 199TH Infantry Brigade (Sep) (Lt).
Operational rept. for quarterly period ending 31 Jan 67.
31 Jan 67, 83p OACSFOR-OT-RD-670222
Distribution limitation now removed.

No abstract available.

AD-388 890 PC **A03**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, HQ, 3D Brigade,4TH Infantry Division.
Operational rept. for quarterly period ending 31 Jan 67.
31 Jan 67, 50p OACSFOR-OT-RD-670223
Distribution limitation now removed.

No abstract available.

AD-388 891 PC **A04**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 1ST Logistical Command.
Operational rept. for quarterly period ending 30 Apr 67.
15 May 67, 58p OACSFOR-OT-RD-670428
Distribution limitation now removed.

No abstract available.

AD-388 892 PC **A04**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 199TH Infantry Brigade (Sep) (Light).
Operational rept. for quarterly period ending 30 Apr 67.
15 May 67, 60p OACSFOR-OT-RD-670467
Distribution limitation now removed.

No abstract available.

AD-388 893 PC **A03**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 11TH Armored Cavalry Regiment.
Operational rept. for quarterly period ending 30 Apr 67.
20 Oct 67, 32p OACSFOR-OT-RD-670472
Distribution limitation now removed.

No abstract available.

AD-388 894 PC **A03**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 199TH Infantry Brigade (Sep) (Light).
Operational rept. for quarterly period ending 31 Jul 67.
15 Aug 67, 39p OACSFOR-OT-RD-670657
Distribution limitation now removed.

No abstract available.

AD-388 906 PC **A03**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 52D Combat Aviation Battalion.
Operational rept. for quarterly period ending 31 Oct 67.
6 Nov 67, 38p OACSFOR-OT-RD-674060
Distribution limitation now removed.

No abstract available.

AD-388 927 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, 1ST Military Intelligence Battalion (Ars) (Fld a).
Operational rept. for quarterly period ending 31 Jan 67.
10 Feb 67, 17p OACSFOR-OT-RD-670107
Distribution limitation now removed.

The primary mission, that of providing tactical interpretation of aerial imagery resulting from tactical air reconnaissance operational elements operating from the Republic of Vietnam in support of all Gree World ground forces, was successfully accomplished during the reporting period. Reproduction of aerial imagery and delivery of imagery to the requesting units, were also accomplished most successfully.

AD-388 928 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 92D Military Police Battalion.
Operational rept. for quarterly period ending 30 Apr 67.
8 May 67, 23p OACSFOR-OT-RD-670347
Distribution limitation now removed.

The Battalion was committed to the mission of general support for vessel and port security along waterways in the III and IV Corps Areas as required by Commanding General, 1st Logistical Command. The Battalion was responsible for providing security teams for MSTS and U.S. Flagships entering Vung Tau and those intransit along inland waterways to various unloading sites and returning. Security teams were responsible for safeguarding vessels, cargoes and storage facilities within port areas; escorting of supplies and equipment from port facilities to storage areas outside the confines of various ports and operating harbor patrol craft at port facilities. The Battalion also was in support of 89th MP Gp to fulfill operational requirements and provided Military Police support to HQ, USARV.

AD-388 929 PC **A03**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, US Army Engineer Command Vietnam (Prov).
Operational rept. for quarterly period ending 31 Oct 67.
31 Oct 67, 42p OACSFOR-OT-RD-674291
Distribution limitation now removed.

No abstract available.

AD-388 975 PC **A03**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 223D Combat Support Aviation Battalion.
Operational rept. for quarterly period ending 31 Oct 67.
14 Nov 67, 36p OACSFOR-OT-RD-674057
Distribution limitation now removed.

No abstract available.

AD-388 976 PC **A03**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 3D Brigade Task Force,4TH Infantry Division.
Operational rept. for quarterly period ending 31 Oct 67.
10 Nov 67, 50p OACSFOR-OT-RD-T674264
Distribution limitation now removed.

No abstract available.

AD-388 997 PC **A03**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 214TH Combat Aviation Battalion.
Operational rept. for quarterly period ending 31 Oct 67.
15 Nov 67, 35p OACSFOR-OT-RD-674133
Distribution limitation now removed.

No abstract available.

AD-388 998 PC **A08**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 1ST Logistical Command.
Operational rept. for quarterly period ending 31 Oct 67.
11 Nov 67, 152p OACSFOR-OT-RD-674290
Distribution limitation now removed.

No abstract available.

AD-388 999 PC **A06**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Operation Kolekole, 2D Brigade,25TH Infantry Division.
Combat after action rept. for period ending 7 Dec 67.
29 Dec 67, 109p OACSFOR-OT-RD-67X159
Distribution limitation now removed.

No abstract available.

AD-389 011 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Battle of an Thach, 2D Battalion, 35TH Infantry, 3D Bde TF,4TH Infantry Division.
Combat after action rept.
10 Nov 67, 12p OACSFOR-OT-RD-67X186
Distribution limitation now removed.

No abstract available.

AD-389 012 PC **A03**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 3D Ordnance Battalion (Ammo).
Operational rept. for quarterly period ending 31 Oct 67.
10 Nov 67, 29p OACSFOR-OT-RD-674002
Distribution limitation now removed.

No abstract available.

AD-389 131 PC **A03**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Operation Paul Bunyan: Land Clearing Operations, 1ST Infantry Division.
After action rept. for period ending 11 Sep 67.
9 Nov 67, 33p OACSFOR-OT-RD-67X098
Distribution limitation now removed.

No abstract available.

AD-389 132 PC **A03**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Operation Akron, 11TH Armored Cavalry Regiment.
Combat after action rept.
28 Mar 68, 32p OACSFOR-OT-RD-67X178
Distribution limitation now removed.

No abstract available.

AD-389 133 PC **A03**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 4TH Psychological Operations Group.
Operational rept. for quarterly period ending 31 Jan 68.
26 Feb 68, 43p OACSFOR-OT-RD-681114
Distribution limitation now removed.

No abstract available.

AD-389 240 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 52D Artillery Group.
Operational rept. for quarterly period ending 31 Jan 68.
3 Apr 68, 19p OACSFOR-OT-RD-681103
Distribution limitation now removed.

No abstract available.

AD-389 269 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 8TH Battalion,4TH Artillery.
Operational rept. for quarterly period ending 31 Jan 68.
1 Feb 68, 21p OACSFOR-OT-RD-681250
Distribution limitation now removed.

No abstract available.

AD-389 270 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 1ST Battalion,30TH Artillery.
Operational rept. for quarterly period ending 31 Jan 68.
3 Feb 68, 13p OACSFOR-OT-RD-681077
Distribution limitation now removed.

No abstract available.

AD-389 278 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Operation Dallas, 11TH Armored Cavalry Regiment.
Combat after action rept.
26 May 67, 16p OACSFOR-OT-RD-67X179
Distribution limitation now removed.

No abstract available.

AD-389 325 PC **A07**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 1ST Infantry Division.
Operational rept. for quarterly period ending 31 Oct 67.
3 Dec 67, 136p OACSFOR-OT-RD-T674246
Distribution limitation now removed.

This Operational Report-Lessons Learned covers the reporting period 1 August-31 October 1967. During this period the 1st Infantry Division continued to conduct combat operations designed to locate and destroy Viet Cong (VC) and North Vietnamese Army (NVA) forces and installations in the 3 Corps Tactical Zone (CTZ). AO STRIKE operations continued into this period with the division employing four battalions on a rotational basis under the OPCON of the 1st Brigade and the overwatch of VIETNAM Marine Corps (VNMC) Task Force operations in the area of operations (AO) until the AO was released to the 9th Infantry Division on 1 September. Operation PORTLAND, a search and destroy operation, was conducted from 12 August to 21 August in response to intelligence information indicating concentrations of VC/NVA forces in the area northeast of MINH THANH and in the area west and northwest of LAI KHE. No significant contact with the enemy resulted, however, recently occupied base camps were discovered. Operation BLUEFIELD 2, conducted 23 September to 28 September, opened Route 301 and cleared the jungle 100 meters on both flanks of the road from BO LA to BAU BANG, without significant enemy activity. Operation SHENANDOAH 2 was initiated 29 September and continues.

AD-389 326 PC **A03**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 2D Howitzer Battalion,17TH Artillery.
Operational rept. for quarterly period ending 31 Jan 68.
31 Jan 68, 38p OACSFOR-OT-RD-681075
Distribution limitation now removed.

No abstract available.

AD-389 327 PC **A03**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 519TH Transportation Battalion (Truck).
Operational rept. for quarterly period ending 31 Jan 68.
1 Feb 68, 48p OACSFOR-OT-RD-681056
Distribution limitation now removed.

The mission of this Battalion remained unchanged during the reporting period. The task organization has been increased and the workload has also increased. In addition, tasking of subordinate units was reorganized. Essentially, the Battalion mission is to command and control all all US Army transportation truck units operating in direct support of US Forces in Thailand.

AD-510 790 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 52d Combat Aviation Battalion.
Operational rept. for quarterly period ending 31 Oct 66.
11 Nov 66, 22p OACSFOR-OT-RD-660346
Distribution limitation now removed.

No abstract available.

AD-510 833 PC **A03**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 11th Aviation Battalion (Combat).
Operational rept. for quarterly period ending 30 Apr 70.
13 May 70, 33p OACSFOR-OT-UT-702059
Distribution limitation now removed.

No abstract available.

AD-510 834 PC **A03**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 525th Military Intelligence Group.
Operational rept. for quarterly period ending 30 Apr 70.
28 Aug 70, 34p OACSFOR-OT-UT-702216
Distribution limitation now removed.

No abstract available.

AD-510 864 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 3d Armored Division.
Operational rept. for quarterly period ending 30 Apr 70.
20 May 70, 15p OACSFOR-OT-UT-702230
Distribution limitation now removed.

No abstract available.

AD-510 865 PC **A03**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 39th Engineer Battalion (Combat).
Operational rept. for quarterly period ending 30 Apr 70.
30 Apr 70, 40p OACSFOR-OT-UT-702034
Distribution limitation now removed.

No abstract available.

AD-510 878 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 29th Civil Affairs Company.
Operational rept. for quarterly period ending 30 Apr 70.
30 Apr 70, 18p OACSFOR-OT-UT-702212
Distribution limitation now removed.

The 29th Civil Affairs Company was operational for the entire reporting period (89 days). The unit was engaged in its primary mission of providing civil affairs support to the I Corps Tactical Zone (ICTZ) Senior Advisor for tactical operations and pacification and development. On 9 March 1970, the company was released from assignment to the 1st Logistical Command and reassigned to XXIV Corps. The same date marked the release of the unit from operational control of the Commanding General III Marine Amphibious Force (III MAF) and placement of the unit under the operational control of Commanding General XXIV Corps. As a result of these changes in the command and control structure the 29th Civil Affairs Company is now able to accomplish administrative, logistical, and operational tasks with minimum delay and increased efficiency.

AD-510 880 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 5th Battalion,27th Artillery.
Operational rept. for quarterly period ending 30 Apr 70.
30 Apr 70, 10p OACSFOR-OT-UT-702009
Distribution limitation now removed.

No abstract available.

AD-510 888 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 61st Medical Battalion.
Operational rept. for quarterly period ending 31 Jul 66.
2 Aug 66, 13p OACSFOR-OT-UT-660203
Distribution limitation now removed.

No abstract available.

AD-510 889 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 68th Medical Group.
Operational rept. for quarterly period ending 30 Apr 66.
14 May 66, 12p OACSFOR-OT-UT-660062
Distribution limitation now removed.

No abstract available.

AD-510 890 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 70th Medical Battalion.
Operational rept. for quarterly period ending 31 Oct 66.
7 Nov 66, 14p OACSFOR-OT-UT-660384
Distribution limitation now removed.

No abstract available.

AD-510 911 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 43d Medical Group.
Operational rept. for quarterly period ending 31 Jul 66.
23 Aug 66, 12p OACSFOR-OT-UT-660192
Distribution limitation now removed.

No abstract available.

AD-510 912 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 89th Military Police Group.
Operational rept. for quarterly period ending 31 Jul 66.
15 Aug 66, 14p OACSFOR-OT-UT-660213
Distribution limitation now removed.

During the period 1 May through 31 Jul 1966, the 89th Military Police Group continued to provide Army wide support throughout the Republic of Vietnam. At the termination of this quarterly period, the total strength of the Group was 3103. With the addition of the 300th Military Police Company, the 92d Military Police Battalion attained operational status. The 252d CI Det also arrived, adding to the investigational support capabilities of the 89th Military Police Group.

AD-510 913 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.

Lessons Learned, Headquarters, 92d Military Police Battalion.
Operational rept. for quarterly period ending 31 Jul 66.
14 Aug 66, 10p OACSFOR-OT-UT-660214
Distribution limitation now removed.

No abstract available.

AD-510 914 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 716th Military Police Battalion.
Operational rept. for quarterly period ending 31 Oct 66.
8 Nov 66, 15p OACSFOR-OT-UT-660421
Distribution limitation now removed.

The 716th Military Police Battalion and attached units were committed operationally throughout the reporting period. The primary mission continues to be security and law enforcement in the Saigon/ Cholon/Tan Son Nhut area. Specific security missions, involving approximately 70% of the military police resources of the battalion, include BOQ's, BEQ's, the US Embassy, critical US facilities, installations and the Saigon Port.

AD-510 927 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 135th Military Intelligence Group.
Operational rept. for quarterly period ending 31 Jan 67.
8 Feb 67, 10p OACSFOR-OT-UT-670104
Distribution limitation now removed.

No abstract available.

AD-510 928 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 504th Military Police Battalion (Army).
Operational rept. for quarterly period ending 31 Jan 67.
10 Feb 67, 12p OACSFOR-OT-UT-670112
Distribution limitation now removed.

During this past quarter the battalion continued to provide military police support throughout the II Corps area of South Vietnam. This included support to Provost Marshal Offices in eight cities as well as PW evacuation from tactical units and hospitals, convoy escorts and road security and traffic control on roads within the II Corps area.

AD-510 929 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 18th Surgical Hospital (MA).
Operational rept. for quarterly period ending 30 Apr 67.
4 May 67, 15p OACSFOR-OT-RD-670335
Distribution limitation now removed.

Contents: Significant Organizational Activities; Evacuation; Communications; Use of Whole Blood; Heliport Construction.

AD-510 930 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 525th Military Intelligence Group.
Operational rept. for quarterly period ending 30 Apr 67.
14 May 67, 9p OACSFOR-OT-RD-670343
Distribution limitation now removed.

No abstract available.

AD-510 931 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 720th Military Police Battalion.
Operational rept. for quarterly period ending 30 Apr 67.
14 May 67, 17p OACSFOR-OT-RD-670353
Distribution limitation now removed.

No abstract available.

AD-510 932 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 135th Military Intelligence Group.
Operational rept. for quarterly period ending 30 Apr 67.
4 May 67, 15p OACSFOR-OT-RD-670481
Distribution limitation now removed.

The 135th Military Intelligence Group continued to support J2 MACV and US Army Vietnam with counterintelligence support aimed at the detection, investigation, exploitation and/or neutralization of hostile and foreign intelligence activities within the Republic of Vietnam. Counterintelligence area coverage was maintained throughout the 44 provinces and Capital Special Zone during the entire quarter, with the organization engaged in operational activities for a total of 89 days. Personnel of the Group continued to advise and assist Military Security Service counterparts at all levels. Counterintelligence support to Headquarters MACV was maintained throughout the period. An expanded Technical Support Branch enabled this organization to provide better and more responsive technical services in the form of CI inspections and surveys, DAME and DASE analysis, photographic service, and audio/visual technical intelligence. In addition, the Group continued to provide security support to all major Army commands operating in the Republic of Vietnam. The Missing/Captured Personnel Intelligence Program monitored developments concerning captured US and Free World military and civilian personnel. During the period, two US military personnel and two US civilian personnel were released by the Viet Cong and returned safely to US control.

AD-511 004 PC **A03**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 5th Battalion,2d Artillery.
Operational rept. for quarterly period ending 30 Apr 70.
1 May 70, 37p OACSFOR-OT-UT-702033
Distribution limitation now removed.

No abstract available.

AD-511 069 PC **A03**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 268th Aviation Battalion (Combat).
Operational rept. for quarterly period ending 30 Apr 70.
6 May 70, 37p OACSFOR-OT-UT-702132
Distribution limitation now removed.

During the reporting period the 268th Aviation Battalion (Combat) continued to provide support to the Free World Military Assistance Forces in the II Corps Tactical Zone. This support was primarily provided in Pleiku, Binh Dinh, Phu Bon, and Phu Yen Provinces. In general, replacements during the last quarter have slightly increased and have been arriving steadily both prior to and after rotation of the individuals they are to replace. In MOS groups 67N, 67U, 67W, 67X, 68D, 71P, 73C, and 92B, the Battalion is understrength. The Battalion received a total of 129 replacements in February, 206 in March, and 125 in April. As of 30 April there were 338 assigned officer personnel (135 Officer and 203 Warrant Officer). Enlisted strength maintained an assigned strength of 1386, compared to an authorized strength of 1502. The 268th Aviation Battalion is 91.5% overall filled with a breakdown as follows: 95.2% officers, 87.4% warrant officers, and 92.2% enlisted.

AD-511 113 PC **A03**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 11th Transportation Battalion (Termina!).
Operational rept. for quarterly period ending 30 Apr 67.
13 May 67, 36p OACSFOR-OT-RD-670398
Distribution limitation now removed.

No abstract available.

AD-511 114 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 394th Transportation Battalion (Terminal).
Operational rept. for quarterly period ending 31 Jan 67.
6 Feb 67, 11p OACSFOR-OT-UT-670167
Distribution limitation now removed.

No abstract available.

AD-511 115 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 27th Transportation Battalion (Truck).
Operational rept. for quarterly period ending 30 Apr 66.
7 May 66, 22p OACSFOR-OT-UT-660086
Distribution limitation now removed.

No abstract available.

AD-511 151 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 12th Aviation Group (Combat).
Operational rept. for quarterly period ending 30 Apr 70.
15 May 70, 21p OACSFOR-OT-UT-702165
Distribution limitation now removed.

No abstract available.

AD-511 152 PC **A03**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 3d Squadron,17th Air Cavalry.
Operational rept. for quarterly period ending 30 Apr 70.
10 May 70, 33p OACSFOR-OT-UT-702055
Distribution limitation now removed.

The squadron's mission has been that of providing reconnaissance, surveillance, security and economy of force support to units operating in the III and IV Corps Tactical Zone.

AD-511 153 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 307th Aviation Battalion (Combat).
Operational rept. for quarterly period ending 30 Apr 70.
15 May 70, 19p OACSFOR-OT-UT-702194
Distribution limitation now removed.

No abstract available.

AD-511 157 PC **A03**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 7th Battalion,15th Artillery.
Operational rept. for quarterly period ending 20 Apr 70.
30 Apr 70, 29p OACSFOR-OT-UT-702008
Distribution limitation now removed.

No abstract available.

AD-874 140 PC **A02**/MF **A01**
Adjutant General's Office (Army), Washington, DC.
Lessons Learned, Headquarters, 24th Evacuation Hospital (Semimobile).
Operational rept. for quarterly period ending 31 Oct 66.
9 Nov 66, 10p OACSFOR-OT-UT-660393
Distribution limitation now removed.

No abstract available.

16.

MISSILE TECHNOLOGY

16C. Missile Warheads and Fuses

AD-306 718 MF **A01**
Aberdeen Proving Ground, MD.
Fragmentation, Blast and Drop Test of T45 Warhead (Modified)
P.L. ROTHLISBERGER. Apr 59, 10p
Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche.

No abstract available.

16D. Missiles

AD-A091 061/2 PC **A02**/MF **A01**
Foreign Technology Div., Wright-Patterson AFB, OH.
The PRC'S SLBM Development,
Dong Gong. 18 Aug 80, 23p Rept no. FTD-ID(RS)T-1022-80
Edited trans. of Conmilit, The Defense Monthly (China) p13-18 Apr 80, by William Brown.

No abstract available.

AD-B019 079/3 PC **A08**/MF **A01**
Hughes Aircraft CO Canoga Park Calif Missile Systems Div
Digital Guided Weapons Technology. Volume I. Digital Processor System Studies.
Final rept. Aug 74-Nov 76,
F. W. Hardy, R. L. Hoolko, A. J. Roach, R. L. Woolley, and S. Y. Wong. Nov 76, 165p DGWT-0230-1-Vol-1, AFATL-TR-76-132-Vol-1
Contract F08635-75-C-0014
See also Rept. no. AFATL-TR-72-202, AD-907 511L.
Distribution limitation now removed.

A digital processing system is defined which will support the integration of the components of an advanced modular weapon system. Modularity requirements of the weapon system led to the choice of a multiplexed digital bus as the prime communication channel in the weapon. The weapon bus presents a common interface to all subsystems and provides a common functional interface between weapon sections. The combination of a digital processor and the weapon bus forms the integration subsystem of the weapon. The functions which are performed in the digital processor to accomplish integration are called the CORE functions. These CORE functions are system management, flight control, and the strapdown inertial navigation function. System management includes weapon system identification, communication control, and self-test. It provides the real time control of the weapon system processor. The strapdown inertial reference function includes the data filtering and position update tasks which interface midcourse guidance sensors with the inertial navigation function. The throughput requirement for the digital processing system is determined by time-critical functions in the flight control subsystem. Propagation delay restrictions in processing inertial sensor data for the flight control stabilization function set both bus transmission rate and processor functional throughput. (Author)

AD-B019 978/6 PC **A05**/MF **A01**
Hughes Aircraft CO Canoga Park Calif Missile Systems Div
Digital Guided Weapons Technology. Volume III. Programmable Digital Autopilot.
Final rept. Aug 74-Nov 76
J. A. Drgon, and L. Pivar. Nov 76, 94p DGWT-0230-1-Vol-3, AFATL-TR-76-132-Vol-3
Contract F08635-75-C-0014
See also Volume 1, AD-B019 079L.
Distribution limitation now removed.

This report describes how current technology was used to produce a programmable digital autopilot (PDAP) capable to satisfying the requirements for three configurations of the Pave Strike glide weapon (GBU-15(V)). A digital design for the three GBU-15(V) analog autopilots was produced. From this design, the requirements for a common PDAP were determined. Two Brassboard PDAPs were then built and evaluated--one in the Hybrid Simulation Laboratory at Eglin Air Force Base and one in a similar simulation at Hughes Aircraft Company. The simulation validated the design concept.

AD-B020 488/3 PC **A08**/MF **A01**
Hughes Aircraft CO Canoga Park Calif Missile Systems Div
Digital Guided Weapons Technology. Volume II. System Simulations.
Final rept. Aug 74-Nov 76,
R. Woolley, R. Hoolko, J. Mouton, D. Sobek, and F. Watson. Nov 76, 162p HAC-Ref-D3003, AFATL-TR-76-132-Vol-2
Contract F08635-75-C-0014
See also Volume 3, AD-B019 978L.
Distribution limitation now removed.

This report describes simulations and field tests performed with the two digital processing systems, DP1 and DP2, which were built on the Digital Guided Weapons Technology Program. The DP1 system was integrated with a GFE Inertial Measurement Unit (IMU); and, after testing at Hughes Aircraft Company, it was integrated with the Completely Integrated Reference Instrumentation System (CIRIS) at the central Inertial Guidance Test Facility (CIGTF), Holloman Air Force Base, New Mexico. Performance tests were carried out by the Air Force in the laboratory, in a van, and in an aircraft. Performance in navigation accuracy relative to CIRIS was determined. The DP2 system was integrated into a semiphysical hybrid computer simulation at the contractor facility. The simulation performed was that of a long-range air-to-surface weapon which uses an aided inertial guidance system for midcourse guidance. A simulated LORAN sensor was used to update the inertial navigation subsystem. The DP2 software included Management and Executive Software and the following computational elements: LORAN processing, alignment filter midcourse guidance law, navigation, and flight control. (Author)

17.

NAVIGATION, COMMUNICATIONS, DETECTION, AND COUNTERMEASURES

17A. Acoustic Detection

AD-A090 836/8 PC **A12**/MF **A01**
Moore School of Electrical Engineering, Philadelphia, PA. Valley Forge Research Center.
Research in Distributed Underwater Acoustic Arrays.
Final rept.,
Fred Haber. 1 Apr 80, 255p Rept no. UP-VFRC-7-80
Contract N00014-77-C-0252

During the interval March 1977 through February 1980, members of the Valley Forge Research Center technical staff have been investigating coherent operation of large underwater acoustic arrays, taking account of the dispersive effects of the medium. Array organizations of two kinds were investigated. The first of these is a very large array comprised of conventional subarrays, the total extend being in the order of hundreds of miles. Most of this work was carried out during the first two years of the project and resulted in a doctoral dissertation. The second system studied is an array of submerged sensors, suspended from freely floating buoys and randomly dispersed over an area of the order of 500-1500 meters in diameter; in this case, therefore, element positions are continually changing. Work on the latter array system was distributed over the entire duration of the project. The results of the study were published in quarterly progress reports of the Valley Forge Research Center and in other publications. We present below a summary of our activities and results along with applicable excerpts from our reports and copies of a published paper and a dissertation. Additional papers for publication, drawn from the material presented here, are in preparation. (Author)

AD-A090 839/2 PC **A07**/MF **A01**
Stanford Univ., CA. Edward L. Ginzton Lab. of Physics.
Acoustically Scanned Optical Imaging Devices.
Semiannual rept. no. 10, 1 Jan-30 Jun 80,
G. S. Kino, J. Bowers, B. Khuri-Yakub, and R. Thornton. Aug 80, 148p Rept no. GL-3165
Contract N00014-76-C-0129, ARPA Order-2778

We have carried out ZnO deposition at a rate of 18 micrometers per hour and obtained films comparable to single crystal. We have made a ZnO on Si Sezawa mode correlator with -50 dBm efficiency, and we have also constructed the first monolithic Schottky diode storage correlator on silicon. (Author)

AD-A091 388/9 PC **A03**/MF **A01**
SACLANT ASW Research Centre, La Spezia (Italy).
A Method of Reducing Bearing Errors in Horizontal Linear Hydrophone Arrays in Shallow Water,
Richard Klemm. 15 Sep 80, 35p Rept no. SACLANTCEN-SR-40

Bearing estimation by means of a horizontal acoustic line array is degraded seriously by the multiple effect caused by dispersion of the field in normal modes. Error-free bearing estimates can be achieved only by means of generalized power estimators that take into account the spatial statistics (i.e. the covariance matrix) as a priori information about the medium. This a priori information is unknown in reality. It has to be substituted either by running a modelling program (e.g. normal mode) or by measurements using a test source. Measurements, however, have to be carried out for all bearings of interest. A method is suggested that uses only one test source at one known direction. The estimated test covariance function is used to calculate a beamformer matrix that can be steered in bearing. Theoretical investigations show that significant reduction of the bearing errors can be achieved. (Author)

17B. Communication

AD-A090 905/1 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Reduction of Quantization Noise in PCM Speech Coding.
Journal article,
Jae S. Lim, and Alan V. Oppenheim. 31 May 79, 5p JA-4988, ESD-TR-80-53
Contract F19628-80-C-0002
Pub. in IEEE Transactions on Acoustics, Speech, and Signal Processing, vASSP-28 n1 p107-110 Feb 80.

No abstract available.

AD-A091 040/6 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Lab. for Information and Decision Systems.
Distributed Decision and Communication Problems in Tactical USAF Command and Control.
Final technical rept. Jun 79-Jun 80,
Alexander H. Levis, Mark E. Connelly, and Michael Athans. 21 Jul 80, 16p LIDS-FR-1018, AFOSR-TR-80-0992
Grant AFOSR-79-0116

Four relevant theoretical problems in tactical Air Force C3 systems are identified and described

briefly. They are: (a) C3 system structure and organization forms, (b) information storage and flow in C3 systems, (c) distributed estimation, and (d) evasive trajectories for tactical aircraft. A summary of the interactions that led to the identification and formulation of the research problems is included. (Author)

AD-A091 042/2 PC **A09**/MF **A01**
Armed Forces Communications and Electronics Association, Eatontown, NJ. Fort Monmouth Chapter.
Proceedings of the Annual Seminar (5th). The Art of Communications Interfaces C3i Environment for the 90s, 21-22 October 1980,
Bernard D. DeMarinis. 21 Oct 80, 195p Rept no. AFCEA-FM-A-5
See also Rept. no. AFCEA-FM-3, AD-A061 466.

Several papers by leading authorities address 'The C3I Environment of the 90s'. Furthermore, the collective efforts of the Army and Industry in countering the battlefield information explosion is addressed. The need for ultra reliable and survivable networks with high mobility and the ability to operate in an intense/adverse electronic warfare environment is also highlighted. (Author)

AD-A091 082/8 PC **A02**/MF **A01**
Fraunhofer-Gesellschaft Garmisch-Partenkirchen (Germany, F.R.). Inst. fuer Atmosphaerische Umweltforschung.
Transmissometer Effectiveness.
Final technical rept. 13 Mar-12 Sep 80,
Reinhold Reiter. 22 Sep 80, 4p
Contract DAJA37-80-C-0256

By means of BARNES transmissometers light transmission in the visible range and infra-red shall be measured under very poor visibility conditions (strong haze, fog, precipitation) over a distance of 2.7 km. To ensure exact transmission even under such conditions a telemetry link has been installed between optical transmitter and receiver. This permits now reliable measurements in both windows as low as < 0,1% transmission. Simultaneously, the telemetry link is used to transmit measured data (temperature, humidity, aerosol particle spectrum, and others) to the Institute. (Author)

AD-A091 168/5 PC **A05**/MF **A01**
General Atronics Corp., Philadelphia, PA.
Harmonic Cancellation System.
Final technical rept. Sep 78-Jan 80,
Stephen J. Rosasco. Sep 80, 85p GAC-3398-3385-24, RADC-TR-80-116
Contract F30602-78-C-0191

The objective of this effort was to investigate Interference Cancellation System (ICS) techniques to solve the harmonic and intermodulation products (IMP) generated as the result of high power jammers, HF/VHF/UHF transmitter signals impinging on a nonlinear junction somewhere on the aircraft during flight. The problem becomes very complex when trying to receive a desired satellite starved signal. Since a reference sample of the nonlinear signal is not available, it has to be synthesized to a high degree of accuracy in order to be able to cancel the interfering signal. The crux of this problem is the synthesization of the nonlinear signal without concurrently cancelling the desired signal. (Author)

AD-A091 297/2 PC **A06**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH.
A Survey of Cable Television's Past, Present and Future Challenges.
Master's thesis,
William Claude Harris. 1 Dec 78, 102p Rept no. AFIT-CI-79-194T

The purpose of this thesis is to bring together in a single volume the pertinent information about the Community Antenna Television industry's early beginnings, federally regulated existence, and its future possibilities without federal regulation. It is intended as a primer; a survey of the CATV industry. It was researched and written on a nontechnical level for those who desire a basic understanding of how a CATV system works and the ways in which new technology may hasten CATV's future growth. While the cable television industry faces many problems such as the copyright and public access issues, there are two paramount issues effecting the future of CATV. Cable television must penetrate the major TV markets to insure continued growth; however, it faces the possibility of competition with the telephone company in these markets. This thesis addresses those two problems.

ED-181 897 Not available NTIS
Swedish Broadcasting Corp., Stockholm.
Maternal Observations of Child Behaviours in the Course of Home Televiewing: A Method for Studying Small Children's Preferences for and Reactions to TV Programmes. Summary of the Method Used in Six Studies of Children,
Cecilia Feilitzen. 21 Sep 71, 10p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

The findings of six studies based on in-home observations of children's television viewing behavior as recorded by mothers, fathers, or other adults caring for the child are summarized and compared. The object of this research method is to determine child interest in the programs, the variability of interest within programs, the amount of series interest in relation to the number of programs, the amount of viewer interest, questioning behavior, and the type of questions raised. This procedure, which has proven useful for children aged three to seven, has been used in samples varying from 150 to 600 subjects. A discussion of the generalizability, reliability, and validity of the results obtained with this method concludes the report.

ED-181 899 Not available NTIS
Swedish Broadcasting Corp., Stockholm.
Children and Identification in the Mass Communication Process. A Summary of Scandinavian Research and a Theoretical Discussion. 146/73,
Cecilia Feilitzen, and Olga Linne. 30 May 74, 42p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

This report defines the concept of identification, presents results of Scandinavian mass communications research studying children's identification with the content of mass media, reviews research in this area, and indicates directions for future research. Two types of identification study are reviewed: those which studied the type of child who identifies with models in the mass media and with whom they identify, and the importance of identification for the effects of mass communication. In this regard, studies of individual and social characteristics, similarity and wishful identification, and identification, and identification with animals and with other children are explored. It is suggested that the focus of past Scandinavian research on whether identification is important in the mass communication process should be reformulated to when it is important, and that studies need to view the process as a long-term process rather than in terms of individual experiences.

ED-181 921 Not available NTIS
Assembly of Arts Administrators of Canada, Winnipeg (Monitoba).
The Children Are Watching: A Survey of Children's Broadcasting in Canada and Some Recommendations for the Future,
Peggy Liptrott, and Alice Poyser. 1979, 29p
Prepared in cooperation with Canada Council, Ottawa (Ontario).
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA 22210.

This report summarizes the findings of a survey of children's broadcasting in Canada, conducted by two media experts who traveled about the provinces and territories of Canada over a one-year period, and recorded their subjective responses to what they discovered. These responses, impressions, and ideas have been translated into recommendations, and a selective bibliography has been assembled.

N81-10239/4 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
An Economics Systems Analysis of Land Mobile Radio Telephone Services.
B. E. Leroy, and S. M. Stevenson. 13 Nov 80, 15p NASA-TM-81476, E-589
Presented at Intelcom 80/Los Angeles Conf., Los Angeles, 10-13 Nov. 1980.

The economic interaction of the terrestrial and satellite systems is considered. Parametric equations are formulated to allow examination of necessary user thresholds and growth rates as a function of system costs. Conversely, first order allowable systems costs are found as a function of user thresholds and growth rates. Transitions between satellite and terrestrial service systems are examined. User growth rate density (user/year/sq km) is shown to be a key parameter in the analysis of systems compatibility. The concept of system design matching the price/demand curves is introduced and examples are given. The role of satellite systems is critically examined and the economic conditions necessary for the introduction of satellite service are identified.

N81-10241/0 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Satellites Using the 30/20 Ghz Band.
J. N. Sivo. 1980, 16p NASA-TM-81600, E-586
To Be Presented at the 1980 Natl. Telecommunications Conf., Houston, Texas, 30 Nov. - 4 Dec.; Sponsored by IEEE.

A review of the future options open to satellite system planners focuses attention on the use of the 30/20 GHz band. Very broad bandwidths available, coupled with a primary allocation for fixed satellite service, make the band very attractive. NASA, in concert with the system and service supplier industries, is planning a research and development program aimed at flight demonstration of 30/20 satellite systems which it is hoped will lead to operational system use in the early 1990's. The communication system concepts and the spacecraft systems necessary to support these for operational use in 1990 and beyond are discussed.

N81-10242/8 PC **A10**/MF **A01**
Mitre Corp., Bedford, Mass.
Second Year Technical Report on-Board Processing for Future Satellite Communications Systems.
W. T. Brandon, W. K. Green, M. Hoffman, P. N. Jean, and W. R. Neal. Oct 80, 255p NASA-CR-165155, MTR-8164
Contract F19628-80-C-0001

Advanced baseband and microwave switching techniques for large domestic communications satellites operating in the 30/20 GHz frequency bands are discussed. The nominal baseband processor throughput is one million packets per second (1.6 Gb/s) from one thousand T1 carrier rate customer premises terminals. A frequency reuse factor of sixteen is assumed by using 16 spot antenna beams with the same 100 MHz bandwidth per beam and a modulation with a one b/s per Hz bandwidth efficiency. Eight of the beams are fixed on major metropolitan areas and eight are scanning beams which periodically cover the remainder of the U.S. under dynamic control. User signals are regenerated (demodulated/remodulated) and message packages are reformatted on board. Frequency division multiple access and time division multiplex are employed on the uplinks and downlinks, respectively, for terminals within the coverage area and dwell interval of a scanning beam. Link establishment and packet routing protocols are defined. Also described is a detailed design of a separate 100 x 100 microwave switch capable of handling nonregenerated signals occupying the remaining 2.4 GHz bandwidth with 60 dB of isolation, at an estimated weight and power consumption of approximately 400 kg and 100 W, respectively.

N81-10252/7 PC **A08**/MF **A01**
Centro Studi e Laboratori Telecomunicazioni, Turin (Italy).
Dynamic Spread Spectrum Time Division Multiple Access (SS/TDMA).
G. B. Alaria, P. Bostica, R. Debassa, P. Destefanis, and E. Guarene. Feb 80, 158p ESA-CR(P)-1320
Contract ESTEC-3657/78-NC-AK(SC)

A demand assignment procedure, the conceptual design of the onboard processor, and the evaluation of hardware complexity and system performance were studied. A demand Assignment Spread Spectrum Time Division Multiple Access system (DA/SS/TDMA) as a back-up for terrestrial network, and a DA/SS/TDMA system suitable for overload traffic were also studied. Both systems are functionally described. Assignment procedures and frame organizations are detailed as well as the conceptual designs. Hardware complexity and reliability problems are analyzed. In a practical example it is shown how some channel saving in a redundant terrestrial network can be obtained if a satellite stand by DA system is provided.

N81-10306/1 PC **A09**/MF **A01**
Technische Hochschule, Aachen (Germany, F.R.). Inst. fuer Theoretische Elektrotechnik.
An Electric Crosspoint.
Final Report.
M. Willmann, and P. Zdebel. Dec 79, 177p BMFT-FB-T-79-176
In German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

The development of an integrated crosspoint circuit for telephone switching applications in fully electronic exchange systems was studied. The progress made towards obtaining junction isolated thyristor switches of high quality and the extended study of functional logics have greatly facilitated the solution of the problems involved. The monolithic bipolar integration of an anlog space-division-multiplex switching network with a complex digital control-logic is described. It has excellent transmission properties. The circuit is manufactured using a bipolar technology 3 inch wafer. The technological aspects of the doping solutions as diffusion sources for buried layer and emitter diffusion are presented.

N81-10743/5 PC **A03**/MF **A01**
Ecole Nationale Superieure des Telecommunications, Paris (France). Dept. Electronique et Physique.
Applications of Optimum Control in Communication Networks Application de la Commande Optimale dans les Reseaux de Communications.
A. Bousquet, and L. F. Pau. Jan 80, 49p ENST-D-80001
Text in French.

The different types of control that can be carried out on the elements of a communication network are recalled. The decentralization problem is then examined in a general way together with its possible applications. The generalized reduced gradient algorithm is particularly well suited to providing numerical solutions to the particular problem posed (queues with priorities under transient conditions and subject to various constraints). The practical realization of such a system is discussed.

PB81-120214 PC **A03**/MF **A01**
Weapons Systems Research Lab., Adelaide (Australia).
Frequency Wavenumber Beamforming by Use of the Two Dimensional Fourier Transform.
Technical rept.,
D. A. Gray. Jul 80, 34p WSRL-0162-TR, AR-002-006

The concept of frequency wavenumber beamforming of a linear array of equispaced receivers is reviewed. The frequency wavenumber spectrum can be evaluated by using a two dimensional Fast Fourier Transform and the properties of the resulting estimate of the frequency wavenumber spectrum are described. Particular attention is given to the distortion of the spectral power estimates due to leakage of negative frequency components.

17D. Electromagnetic and Acoustic Countermeasures

AD-A091 317/8 PC **A10**/MF **A01**
Army TRADOC Systems Analysis Activity, White Sands Missile Range, NM.
Electronic Warfare in Army Models - A Survey.
Technical rept.,
Herbert P. Bustillos, Jr., Paul Kunselman, and John B. Clark. Aug 80, 203p Rept no. TRASANA-TR-7-79

This survey report presents and synopsizes those models which have been identified as having the capability of representing electronic warfare. The effort covers most, if not all Army models and what is considered a good cross-section of Air Force models that play electronic warfare. All models and simulations are listed alphabetically and indexed by title, purpose, description, electronic warfare capabilities, status, and computer/language used. (Author)

AD-A091 319/4 PC **A05**/MF **A01**
MITRE Corp., Bedford, MA.
A Data Link Design with a Variable Data Rate and Variable Jam Resistant Capability.
Rept. for Sep 78-Sep 79 on Phase 1,
B. D. Campbell, E. A. Palo, and M. A. Poole. Jul 80, 97p MTR-3850, RADC-TR-80-214
Contract F19628-79-C-0001

This report describes work performed on Project 7130 during FY79. The objective of this phase was to address the technical issues involved in variable data rate/variable jam resistant data link technology. The design approach was based on cost-performance trade-offs for the signal processing elements of a two-terminal, data link system with up to 1 GHz spread spectrum bandwidth operating with data at rates of from 100bps to 1Mbps. The design and design process for a laboratory model are presented. Cost estimates for large production quantities for the data link are also presented. (Author)

AD-309 096 PC **A03**/MF **A01**
Aberdeen Proving Ground, MD.
Final Engineering Test of the Range Finder, All Weather (Electronic Type), T47
J. TARBERT. Jun 59, 43p
Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche.

No abstract available.

17E. Infrared and Ultraviolet Detection

AD-A091 068/7 PC **A02**/MF **A01**
Foreign Technology Div., Wright-Patterson AFB, OH.
Compound Application of Microwaves and Infrared,
Zhou Hongren. 31 Jul 80, 15p Rept no. FTD-ID(RS)T-0921-80
Edited trans. of Hang K' ung Chih Shih (China) n4 p44-46 1977, by William Brown.

No abstract available.

17G. Navigation and Guidance

AD-A091 118/0 PC **A03**/MF **A01**
Naval Weapons Center, China Lake, CA.
Concealed Origin Optical Locating System (COOLS).
Test rept. Dec 77-Oct 78,
Thomas E. Loftus. Mar 79, 28p Rept no. NWC-TP-6090

This report summarizes a demonstration test of a FLIR-compatible helicopter landing aid conducted at the Naval Weapons Center (NWC) in FY 1978. The system is a means by which the secure landing of helicopters can be accomplished in adverse visibility conditions. For this test, a night vision sensor (FLIR) was mounted with a CO2 laser illuminator on a UH-1N helicopter. The FLIR image was annotated with range to the landing site and closing rate data provided by a separate airborne electro-optical rangefinder. The landing site was equipped with a portable FLIR beacon (PFB) for long-range (greater than 3 kilometer) homing and a retroreflector array for landing site identification during short-range (less than 1.5 kilometer) approach and landing. Data were recorded in the aircraft and a video tape showing the results of testing the various elements of the system was generated. (Author)

AD-A091 273/3 MF **A01**
Control Dynamics Co., Huntsville, AL.
Application of Discrete Guidance and Control Theory to Future Army Modular Missiles.
Final technical rept.,
S. M. Seltzer. 30 Sep 80, 122p
Contract DAAK40-79-C-0213
Availability: Microfiche copies only.

This technical report covers the Control Dynamics Company's efforts performed in completing the requirements set forth in Technical Requirement No. T-0208, entitled, 'Application of Digital Technology to Guidance and Control Theory.' Described is a simple analytical set of tools developed to help the practicing control system design engineer. These tools are the Parameter Space technique and the Cross-Multiplication technique. Also described is a comprehensive Digital Design seminar conducted for selected members of the Guidance and Control Directorate. Application of advanced digital theory to the PERSHING II digital autopilot is described, as well as the beginning efforts to evaluate the consequences of microprocessor implementation of digital filters. (Author)

N81-10021/6 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
Nasa Aviation Safety Reporting System.
Quarterly Report, 1 Jan. - 31 Mar. 1979.
Apr 80, 34p NASA-TM-81225, A-8311
Prepared in Cooperation with Battelle Columbus Labs., Mountain View, Calif.

A comprehensive study of near midair collisions in terminal airspace, derived from the ASRS database is presented. A selection of controller and pilot reports on airport perimeter security, unauthorized takeoffs and landings, and on winter operations is presented. A sampling of typical Alert Bulletins and their responses is presented.

N81-10043/0 PC **A06**/MF **A01**
Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt e.V., Brunswick (Germany, F.R.).
Analysis of the Function Principle and Operational Assessment of an Onboard Glidepath Guidance System for Visual Approaches (Visual Approach Monitor (Vam).
J. Thomas, and H. Stein. Oct 79, 107p DFVLR-FB-79-38
In German; English Summary. Report Will Also Be Announced as Translation (Esa-TT-655).

The visual approach monitor, VAM, a head-up display system for manual approach was analyzed as regards its functioning principles and associated error characteristics. System simulations and flight tests were carried out with special emphasis on performance and stability studies. Experimental comparisons between VAM guided and unaided visual approaches revealed no significant advantages for VAM as far as flight path accuracy is concerned. However, VAM performed significantly better with regard to variances and extreme values for nearly all flight guidance parameters. Its overall performance was found to be comparable to that of the instrument landing system.

N81-10044/8 PC **A11**/MF **A01**
Royal Aircraft Establishment, Farnborough (England).
Contributions to the United Kingdom Microwave Landing System Research and Development Program, 1974 to 1978. Volume 1.
J. M. Jones. May 79, 250p RAE-TR-79052-V-1, RAE-RAD-NAV-V-L-1
3.

In support of the UK MLS program Doppler Microwave Landing System (DMLS) equipment operating on both frequency division and time division multiplex formats was extensively evaluated by

means of analysis, ground and flight tests and hybrid simulation. Results show that the use of the Doppler technique leads to simple and reliable equipment with performance well inside the operational requirements. A full understanding of the possible environmental effects on system performance at 5 GHz was obtained.

N81-10045/5 PC **A08**/MF **A01**
Royal Aircraft Establishment, Farnborough (England).
Contributions to the United Kingdom Microwave Landing System Research and Development Program, 1974 to 1978. Volume 2.
J. M. Jones. May 79, 168p RAE-TR-79052-V-2, BR79052
3.

In support of the UK MLS program, Doppler Microwave Landing System (DMLS) equipment operating on both frequency division and time division multiplex formats was extensively evaluated by means of analysis, ground and flight tests and hybrid simulation. Charts and figures pertaining to the following topics are presented: the Doppler MLS technique; basic data collection for ICAO submission; FDM system test results; and the time division multiplex system.

N81-10046/3 PC **A11**/MF **A01**
Royal Aircraft Establishment, Farnborough (England).
Contributions to the United Kingdom Microwave Landing System Research and Development Program, 1974 to 1978. Volume 3.
J. M. Jones. May 79, 237p RAE-TR-79052-V-3, BR79052
3.

In support of the UK MLS program, Doppler Microwave Landing System (DMLS) equipment operating on both frequency division and time division multiplex formats was extensively evaluated by means of analysis, ground and flight tests and hybrid simulation. Charts and figures pertaining to the following topics are presented: the Doppler simulator and time division multiplex bench measurements; flight trials results of the TDM system; field trials at operational airports; and a referenceless system.

N81-10047/1 PC **A07**/MF **A01**
European Space Agency, Paris (France).
On the Accuracy Improvement of Incremental Readout Techniques for Inertial Sensors.
Ph.D. Thesis - Technische Univ., Brunswick.
D. Rahlfs. Nov 79, 149p ESA-TT-573, DLR-FB-77-70
Transl. Into English of "Zur Genauigkeitssteigerung Inkrementeller Ausleseverfahren fuer Traegheitssensoren", Rept. Dlr-FB-77-70 Dfvlr, Brunswick, Apr. 1978. Original Report in German Previously Announced as N79-30170.

Incremental feedback techniques offer digital readout for inertial sensors with high solution. A binary pulse width modulated quantizer is analyzed and an incremental feedback loop is synthesized. The accuracy of the readout depends on the time stability of the feedback time current pulses. A generator of high precision time current pulses is investigated and the readout technique is applied to three types of pendulous accelerometers. Relative stability of better than 1/1,000,000 per day was obtained. Suggestions for further improvement of readout techniques for inertial sensors are given. This technique can be applied in general to any current feedback sensor with integrating behavior.

N81-10308/7 PC **A03**/MF **A01**
European Space Agency, Paris (France).
Digital Prefiltering of Correlated Measurement Noise Using Regression Lines.
R. Froriep. Jan 80, 45p ESA-TT-604, DFVLR-MITT-79-05
Transl. Into English of "Digitale Vorfilterung bei Korrelierten Messstoerungen durch Ausgleichsgerade" Rept. Dfvlr-Mitt-79-05 Dfvlr, Oberpfaffenhofen (Germany, F.R.). May 1979. Original Report in German Previously Announced as N80-17059.

The fast initial fine alignment of an inertial platform with a Kalman filter accelerated by a digital prefilter is shown. The digital prefilter is used to estimate certain state variables by constructing linear mean square regression lines from each batch of measurements with colored noise. The developed prefilter is characterized by a brief computation time and small storage requirements, which makes a very high data rate possible. The choice of filter structure and parameters is discussed referring to simulation results. The filter algorithm is illustrated step by step, both on line and off line. It is compared to prefiltering by averaging and is shown to perform well.

N81-10344/2 PC **A04**/MF **A01**
National Aeronautics and Space Administration, Huntsville, AL. George C. Marshall Space Flight Center.
Electrical Torques on the Electrostatic Gyro in the Gyro Relativity Experiment.
P. Eby, and W. Darbo. Oct 80, 66p NASA-TM-78311

A comprehensive discussion and calculation of electrical torques on an electrostatic gyro as they relate to the gyroscope experiment to test general relativity is presented. Drift rates were computed for some typical state of the art rotors, including higher harmonics in the rotor shape. The effect of orbital averaging of gravity gradient forces, roll averaging of torques, and the effect of spin averaging on the effective shape of the rotor were considered. The electrical torques are reduced sufficiently in a low g environment to permit a measurement of the relativistic drifts predicted by general relativity.

17H. Optical Detection

AD-B043 376/3 PC **A06**/MF **A01**
Charles Stark Draper Lab., Inc., Cambridge, MA.
ILS3 Simulation Overview and Preliminary Users Guide.
Final rept. Jan-Dec 78,
Saul Serben, and F. Satlow. Jun 79, 115p R-1267, SD-TR-80-06
Contract F04701-76-C-0178, Grant ARPA Order-3223
Distribution limitation now removed.

A system software architecture and accompanying algorithms are developed to aid in the analysis of large flexible satellites and their sensors. System features and constraints as well as data base definition are included. A sample problem to illustrate the use of the system for a simplified model of a typical large space structure is presented. (Author)

17I. Radar Detection

AD-A090 838/4 PC **A09**/MF **A01**
Moore School of Electrical Engineering, Philadelphia, PA.
Super-Resolution Imagery by Frequency Sweeping.
Final rept.,
N. H. Farhat, and C. Werner. 15 Aug 80, 179p AFOSR-TR-80-1068
Grant AFOSR-77-3256

A longstanding problem in radar and electromagnetic scattering measurements is the reconstruction of object shape and detail, i.e. an image, from far field scatter data to be used in object identification and classification. During the period covered by this report we have been able to demonstrate in a feasibility study the first reconstruction of a 3-D image of a perfectly reflecting object from its wave-vector diversity (multifrequency and multiaspect) scatter data making use of a new Weighted Fourier Domain Projection Theorem (WFDPT) and establish a relationship between holography with wavelength diversity and inverse scattering. Coherent wave vector diversity radar techniques are used to access a finite volume of the 3-D Fourier space (also known as reciprocal space or p-space) of the scattering object. The WFDPT permits the use of hybrid (digital/optical) computing that enables the retrieval and display of 3-D image information in parallel slices or cross-sectional outlines. The major attributes of this approach as compared to totally digital computing are its potential for displaying a true 3-D image in real-time. Wave-vector diversity methods appear suitable for the imaging of two classes of practical objects namely non-dispersive perfectly reflecting objects of the type often encountered in radar (and sonar) and semi-transparent weakly scattering objects such as certain ultrasound and light scattering objects encountered in biology and medicine.

AD-A090 906/9 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Suppression of Range Sidelobes in Bistatic Radars.
Journal article,
J. J. Gerald McCue. 12 Oct 79, 3p JA-4977, ESD-TR-80-51
Contract F19628-80-C-0002
Pub. in Proceedings of the IEEE, v68 n3 p422-423 Mar 80.

No abstract available.

AD-A091 049/7 PC **A06**/MF **A01**
Rome Air Development Center, Griffiss AFB, NY.
A Model for High Frequency Radar Auroral Clutter,
Terence J. Elkins. Mar 80, 111p Rept no. RADC-TR-80-122

A model is developed to permit estimation of the effects of irregularities in the auroral ionosphere in producing clutter experienced by Over-The Horizon radars operating at high geomagnetic latitudes. The model is used on various sources of data, including auroral radar (HF, VHF, UHF), vertical incidence ionosondes, satellite particle detectors, and optical sensors (ground-based and satellite-borne). The model addresses both the amplitude and Doppler components of auroral radar clutter and also the effect of ionospheric refraction that is extremely important at high frequencies. Consideration is given to the question of predictability of the effects of auroral clutter on HF radar systems. An important component of the model is the incorporation of data from the Polar Fox II experiment conducted for the purpose of evaluating auroral clutter effects on OTH radars. (Author)

AD-A091 110/7 PC **A03**/MF **A01**
Rome Air Development Center, Griffiss AFB, NY.
The Derivation of a Multivariate Probability Density Function Having an Exponential-Type Bivariate Marginal Density.
Technical rept.,
John F. Lennon. Apr 80, 31p Rept no. RADC-TR-80-153

For the calculation of electromagnetic scattering from rough terrain, relations have been established between the scattering cross section and the statistical characterization of the surface. These relations are based on the assignment of a bivariate probability density to the observed surface heights at any two points of a region. To implement a scattering calculation in a region, joint probability density functions that will reduce to appropriate bivariate marginal densities are associated with the distribution of heights in the area. In some instances, however, the required form of the multivariate probability density is not evident, since the original form is not necessarily preserved as successive marginal densities are formed. This report describes the procedures used to determine the multivariate probability density function that reduces to the particular bivariate exponential marginal density form having a known correspondence to electromagnetic scattering. Expressions are given both for the multivariate probability density and for the associated marginal densities of any order. (Author)

AD-A091 189/1 PC **A07**/MF **A01**
ITT Gilfillan, Van Nuys, CA.
Signal Processor for Unattended Radar (SPUR) Phase II.
Final technical rept. May-Sep 79,
John M. Milan, Charles D. Lucas, Jr., and Daniel M. Kikuta. Aug 80, 138p RADC-TR-80-254
Contract F30602-78-C-0288

This final report documents the results of a five-month Validation Program conducted during Phase II of a contract to examine Signal Processing for Unattended Radars. The Validation Program was based on risk reduction recommendations generated during Phase I of the SPUR: Conceptual Design. Identified critical circuits and firmware were designed, some developed, and some tested to validate the estimates of reliability, power, functional performance, fault monitoring and recovery, and stability of the recommended processor. Recommendation for further development and testing are included. (Author)

AD-A091 282/4 PC **A02**/MF **A01**
Range Commanders Council, White Sands Missile Range, NM. Inter-Range Instrumentation Group.
Noncoherent C-Band Transponder Standards.
1980, 18p Rept no. IRIG-STANDARD-115-80

Most of the modern noncoherent C-band pulse transponders available today are the result of commercial development with some guidance from the U.S. Government in terms of specifications or user requirements. The transponder manufacturing field is rather small and limited to companies who have become strongly entrenched over the years. As a general statement, most of these companies meet, or can meet, the standards set forth in this document. These standards have been written to accommodate the present state-of-the-art in both the radar and the transponder fields. Not all existing C-band instrumentation radars are completely compatible with all existing transponders. These system standards are an IRIG recommendation primarily for the purpose of establishing and preserving compatibility of the noncoherent C-band pulse transponders and C-band range instrumentation radars of the present and near future.

AD-A091 320/2 PC **A05**/MF **A01**
Applied Science Associates, Inc., Apex, NC.
A Study of Terrain Scattering Physics.
Interim rept.,
Gary S. Brown. Aug 80, 76p RADC-TR-80-284
Contract F19628-78-C-0211

This report presents interim results of a study to improve existing models for scattering from rough terrain. The two-scale composite surface model is first corrected to properly account for shadowing. This correction shows that both the optical and Bragg scattering terms in the expression for sigma degrees go to zero as grazing incidence is approached. The shadowing function for non-Gaussian surfaces is shown to be easily obtained from existing theories and numerical results for exponentially distributed surfaces are presented. The two-scale composite surface based upon the Burrows perturbation theory is extended to the following cases; bistatic scattering from a dielectric surface with small scale roughness, and bistatic scattering from a dielectric surface with large and small scales of roughness. Comparisons are made with the Rice theory for both cases. Finally, it is shown how an existing theoretical relationship between the height and slope probability density functions can be used in practically obtaining one from the other. (Author)

AD-312 433 MF **A01**
Aberdeen Proving Ground, MD.
Investigation of the Blind-Speed Problem as Related to a Pulse Doppler Radar
JOSEPH STANLEY, and EMMET J. O'BRIEN.
Aug 59, 10p
Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche.

No abstract available.

N81-10256/8 PC **A05**/MF **A01**
Atomic Weapons Research Establishment, Aldermaston (England).
The Calculation of Radar Cross Sections.
R. Pizer. Apr 80, 94p AWRE-O-44/79, BR73529

The FORTRAN program CHAOS, used for calculating cross sections is described including the physical approximations used to simplify Maxwell's equations. The scattering bodies are extended to both open and closed surfaces. The numerical methods used are supplied. The problems of wire junctions, of finite conductivity and the attaching of lumped loads to the structure are considered. Techniques for dealing with bodies having rotational or left-right symmetries are examined as well as the sparse matrix approximation and the complex frequency version of CHAOS. The formula used to calculate the impedance matrix elements, and the conventions adopted concerning coordinate systems and polarization are included.

PB81-120305 PC **A06**/MF **A01**
National Oceanic and Atmospheric Administration, Washington, DC. Environmental Data and Information Service.
Calibration and Intercomparison of the GATE C-Band Radars,
M. Hudlow, R. Arkell, V. Patterson, P. Pytlowany, and F. Richards. Nov 79, 105p NOAA-TR-EDIS-31, NOAA-80101507
Prepared in cooperation with Massachusetts Inst. of Tech., Cambridge. Dept. of Meteorology.

The field portions of a major experiment within the Global Atmospheric Research Program (GARP), the GARP Atlantic Tropical Experiment (GATE), were conducted from June through September 1974. A central objective of GATE was to establish a high quality data base for studying the interactions between the large scale circulations and the smaller scale weather systems over the tropical Atlantic Ocean. Better understanding of these interactions is needed to improve the parameterization of convection in the numerical weather prediction models. Steps were taken to provide for (1) accurate calibration of the radar hardware; (2) adequate pre-GATE testing of the radar systems; (3) consistency, in the mean, between the reflectivity fields from the individual radars, based on various intercomparison techniques; (4) assessment and removal of systematic biases; (5) verification of estimated systematic biases based on 'ground-truth' comparisons with the shipboard rain gages; and (6) assessment of probable accuracies of the final rainfall estimates. C-band radar data, supplemented with shipboard rain-gage data, formed the primary data base for deriving the rainfall estimates. Shipboard meteorological radar measurements were taken with a total of four C-band and four X-band.

17J. Seismic Detection

AD-A091 107/3 PC **A04**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Seismic Discrimination.
Semiannual technical summary rept. 1 Oct 79-31 Mar 80,
Michael A. Chinnery. 31 Mar 80, 68p ESD-TR-80-15
Contract F19628-80-C-0002, ARPA Order-512

This report describes 19 investigations in the field of seismic discrimination. The contributions are grouped as follows: 6 describe progress in the development of a Seismic Data Center; 3 describe research into seismic algorithms that will be implemented at the Data Center; 7 are concerned with the problem of source characterization using the seismic moment-tensor formulation; and 3 describe recent improvements in our in-house computer systems. (Author)

18. NUCLEAR SCIENCE AND TECHNOLOGY

18A. Fusion Devices (Thermonuclear)

BNL-28270 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Performance of BNL-TSTA Compound Cryopump.
H. C. Hseuh, and H. A. Worwetz. 1980, 20p CONF-801037-6
Contract AC02-76CH00016
American Vacuum Society conference, Detroit, MI, USA, 13 Oct 1980.

A compound cryopump using cryocondensation pumping for hydrogen isotopes and cryosorption pumping with coconut charcoal as adsorbent for helium was designed. This compound cryopump was subsequently built (by Janis Research, Stoneham, MA) and has been tested at Brookhaven, fulfilling the design requirements and are delivered to Tritium Systems Test Assembly (TSTA) Vacuum Facility at Los Alamos Scientific Laboratory (LASL) for on-line operations. (ERA citation 05:037447)

CEA-CONF-4694 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Dept. de Physique du Plasma et de la Fusion Controlee.
Study of Waveguides for Far Infrared Diagnostics of Tokamak Plasmas.
J. P. Crenn, and D. Veron. 1979, 3p CONF-790355-2
International conference on infrared physics, Zurich, Switzerland, 5 Mar 1979.
U.S. Sales Only.

Far infrared laser beams used in plasmas diagnostics (as electron density measurements) in the next large Tokamak generation, will propagate along distances up to several tens of meters. Since, density gradient inside the plasmas can lead to refraction angle of 10 exp -2 radians, large beam displacements are expected. Then, optical propagation may be difficult to use under these conditions. So, waveguide propagation is investigated with particular attention to attenuation, depolarizing effects and detection efficiency at the output of the guide. (Atomindex citation 11:515283)

CEA-CONF-4695 PC **A02**/MF **A01**
Association Euratom-CEA sur la Fusion, Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Dept. de Physique du Plasma et de la Fusion Controlee.
New Trapped-Ion Instability with Large Frequency and Radial Wavenumber.
M. Tagger, and R. Pellat. 1979, 8p CONF-790469-6
1979 Sherwood meeting, Mt Pocono, PA, USA, 18 Apr 1979.
U.S. Sales Only.

The need for theoretical previsions concerning anomalous transport in large Tokamaks, as well as the recent results of PLT, ask the question of the process responsible for non-linear saturation of trapped-ion instabilities. This in turn necessitates the knowledge of the linear behaviour of these waves at large frequencies and large radial wavenumbers. We study the linear dispersion relation of these modes, in the radially local approximation, but including a term due to a new physical effect, combining finite banana-width and bounce resonances. Limiting ourselves presently to the first harmonic expansion of the bounce motion of trapped ions, we show that the effect of finite banana-width on the usual trapped-ion mode is complex and quite different from what is generally expected. In addition we show, analytically and numerically, the appearance of a nex branch of this instability. Essentially due to this new effect, it involves large frequencies (omega approximately omega sub(b) and is destabilized by large radial wavelengths (ksub(x) lambda approximately 1, where lambda is the typical banana-width). We discuss the nature

of this new mode and its potential relevance of the experiments. (Atomindex citation 11:515466)

DOE/ER-0046/1 PC **A13**/MF **A01**
Department of Energy, Washington, DC. Office of Fusion Energy.
Damage Analysis and Fundamental Studies. Quarterly Progress Report, January-March 1980.
May 80, 276p

The DAFS program element is a national effort composed of contributions from a number of National Laboratories and other government laboratories, universities, and industrial laboratories. It was organized by the Materials and Radiation Effects Branch, Office of Fusion Energy, DOE, and a Task Group on Damage Analysis and Fundamental Studies which operates under the auspices of that Branch. The purpose of this series of reports is to provide a working technical record of that effort for the use of the program participants, for the fusion energy program in general, and for the Department of Energy. This report is organized along topical lines in parallel to a Program Plan of the same title so that activities and accomplishments may be followed readily, relative to that Program Plan. Thus, the work of a given laboratory may appear throughout the report. The Table of Contents is annotated for the convenience of the reader. (ERA citation 05:037449)

DOE/ER-0075 PC **A03**/MF **A01**
Department of Energy, Washington, DC.
Neutral Beam Development Plan.
H. S. Staten. Aug 80, 32p

The national plan is presented for developing advanced injection systems for use on upgrades of existing experiments, and use on future facilities such as ETF, to be built in the late 1980's or early 90's where power production from magnetic fusion will move closer to a reality. Not only must higher power and longer pulse length systems be developed , but they must operate reliably; they must be a tool for the experimenter, not the experiment itself. Neutral beam systems handle large amounts of energy and as such, they often are as complicated as the plasma physics experiment itself. This presents a significant challenge to the neutral beam developer. (ERA citation 05:035813)

DOE/ET/53036-20 PC **A02**/MF **A01**
Texas Univ. at Austin. Fusion Research Center.
Tokamak Current Driven by Electromagnetic Waves.
S. M. Mahajan, and D. A. Hitchcock. Aug 80, 10p
FRCR-215
Contract AC05-76ET53036

An expression for quasilinear diffusion in an electromagnetic field is derived, and based on that, a new scheme for current drive which utilizes the (E x B) motion of electrons in a purely transverse electromagnetic field is proposed and discussed. (ERA citation 05:037370)

ECN-64 PC **A02**/MF **A01**
Netherlands Energy Research Foundation ECN, Petten.
Estimated Target Accuracies for Neutronic Responses in Fusion Reactors.
K. A. Verschuur. Dec 79, 17p
Advisory group meeting on nuclear data for fusion reactor technology, Vienna, Austria, 11 - 15 Dec 1978.
U.S. Sales Only.

Most system studies contain sufficient information to derive cost sensitivities for the main neutronic responses, which then can be used for the estimation of target accuracies. Target accuracies for the energy-multiplication of the blanket, the tritium breeding ratio, the radiation damage and radiation heating of the superconducting coils and the dose rate behind the biological shield, have been calculated for three UWMAK studies, the PPPL, and the reversed field pinch of Culham and of Los Alamos. The results are discussed. (Atomindex citation 11:515479)

ECN-77 PC **A04**/MF **A01**
Netherlands Energy Research Foundation ECN, Petten.
Reactor Study on a Belt-Shaped Screw Pinch.
M. Bustraan, W. M. P. Franken, H. Th. Klippel, H. J. Veringa, and K. A. Verschuur. Oct 79, 51p
U.S. Sales Only.

A previous study on a screw-pinch reactor with circular cross section (ECN-16 (1977) or Rijnhuizen report 77-101) has been extended to a belt configuration which allows to raise beta to 0.5. The present study starts from the main assumptions and principal constraints of the previous work, but some technical aspects are treated more realistically. More attention has been paid to the modular construction, the non-uniform distribution of the wall loading, the thermo-hydraulics, the design of and the losses in the coil systems, and the energy storage and electric transmission systems. A potential use of the first wall of the blanket as part of the implosion coil system is suggested. Finally, a conceptual design of a reactor, with a cost estimate is given. Numerical results are given of parameter variations around the values for the reference reactor. The belt screw-pinch reactor with resistive coils turns out to be uneconomical because of its low net efficiency and its high capital costs. The application of superconducting coils to reduce the ohmic losses turns out to be a non-viable alternative. A more promising way to improve the energy balance seems to be the alternative scheme of fuel injection during the burn. (Atomindex citation 11:511850)

EUR-CEA-FC-1004 PC **A02**/MF **A01**
Association Euratom-CEA sur la Fusion, Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Dept. de Physique du Plasma et de la Fusion Controlee.
Cyclotronic Heating. Antenna Impedance in the Presence of a High Absorption Mechanism.
J. Adam. May 79, 20p
In French.
U.S. Sales Only.

The calculation described deliberately abandons previous hypothese on the assumption that the efficiency of the dissipation mechanism is sufficient for preventing the wave emitted towards the plasma from returning to the antenna after being reflected on the metal walls. Such would also be the case for an antenna radiating in a semi-finite space, and this is the simple model that we have adopted. The calculation is very elementary and could no doubt be refined by taking into account particularly the fact that wave emitted must tackle a density gradient. However, as it is it appears to account fairly well for the values observed in TFR without it being necessary to make use of a refined understanding of dissipation mechanisms. (Atomindex citation 11:515242)

GA-A-15800 PC **A02**/MF **A01**
General Atomic Co., San Diego, CA.
Application of an Array Processor to the Analysis of Magnetic Data for the Doublet III Tokamak.
T. S. Wang, and M. T. Saito. Aug 80, 17p CONF-800415-3
Contract AT03-76ET51011
Annual FPS Users' conference, San Francisco, CA, USA, 28 Apr 1980.

Discussed herein is a fast computational technique employing the Floating Point Systems AP-190L array processor to analyze magnetic data for the Doublet III tokamak, a fusion research device. Interpretation of the experimental data requires the repeated solution of a free-boundary nonlinear partial differential equation, which describes the magnetohydrodynamic (MHD) equilibrium of the plasma. For this particular application, we have found that the array processor is only 1.4 and 3.5 times slower than the CDC-7600 and CRAY computers, respectively. The overhead on the host DEC-10 computer was kept to a minimum by chaining the complete Poisson solver and free-boundary algorithm into one single-load module using the vector function chainer (VFC). A simple time-sharing scheme for using the MHD code is also discussed. (ERA citation 05:037391)

GA-A-15953 PC **A05**/MF **A01**
General Atomic Co., San Diego, CA.
Radiation Shielding Design Considerations for Doublet III.
B. A. Engholm. Jun 80, 82p CONF-800607-86
Contract AT03-76ET51011
American Nuclear Society annual meeting, Las Vegas, NV, USA, 8 Jun 1980.

Calculations and measurements were made of the bremsstrahlung (x-ray) doses resulting from runaway electron shots at Doublet III. The analysis considered direct, wall-scattered, and skyshine contributions. Reasonably good agreement was obtained between calculations and measurements. The x-ray dose in the control room was about 1 mR per runaway shot, while that at the north boundary was undetectable, with a calculated value of 0.05 mR per shot. These low doses attest to the adequacy of the 2 ft concrete shadow shield surrounding the Doublet III room. Exploratory shielding analyses were performed for possible neutron generation if Doublet III were operated with neutral beam injection in an aggressive D-D mode. (ERA citation 05:035821)

GA-A-15984 PC **A03**/MF **A01**
General Atomic Co., San Diego, CA.
Lower Hybrid Wave Electron Heating Experiments in Doublet IIA.
R. L. Freeman, J. L. Luxon, and V. S. Chan. Jul 80, 26p CONF-800932-4
Contract AT03-76ET51011
Joint Grenoble-Varenna international symposium on heating in toroidal plasmas, Como, Italy, 3 Sep 1980.

Experiments designed to heat electrons by Landau damping of waves at approximately twice the lower hybrid frequency have been carried out on Doublet IIA. This objective is in contrast to other lower hybrid experiments which are designed to heat ions using frequencies corresponding to the lower hybrid resonance frequency. Up to 500 kW of rf power was applied to discharge with approximately 100 kW ohmic input using parallel wavelengths chosen to optimize the spatial distribution of the power deposition based on linear or quasi-linear Landau damping. (ERA citation 05:037372)

HEDL-SA-2165-FP PC **A03**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Startup of Experimental Lithium System.
D. L. McCauley. Jun 80, 31p CONF-800814-16
Contract AC14-76FF02170
180. American Chemical Society meeting/2. chemical congress of the North American Continent, San Francisco, CA, USA, 24 Aug 1980.

The Experimental Lithium System (ELS) is designed for full-scale testing of targets and other lithium system components for the Fusion Materials Irradiation Test (FMIT) Facility. The system also serves as a test bed for development of lithium purification and characterization equipment, provides experience in operation of large lithium systems, and helps guide FMIT design. (ERA citation 05:035822)

IAE-3116 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Atomnoi Energii.
Program for Calculating Plasma-Physical Parameters of a Tokamak Reactor in the Framework of the Zero-Dimensional Model.
A. S. Kukushkin. 1979, 20p
In Russian.
U.S. Sales Only.

The program for calculating plasma-physical parameters of a tokamak reactor in the framework of the zero-dimensional model involves a numerical solution for a system of any set (from one to four) of the following equations: energy balance equation, alpha -particle balance one, ion balance one, pressure balance one (equilibrium equation). Any variables of the equations may be chosen as independent. While choosing geometrical dimensions as unknown quantities (plasma small radius, aspect relation, extension of cross section, blanket thickness), it is possible to assign definite ratios of similarity to other parameters. The above program may be used in two different regimes, i.e. as plasma part while calculating the reactor as a whole, and independently for the calibration- of averaged parameters used in it. For this purpose the program contains subprograms providing for input and output of necessary information, along with the main block of the solution of balance equation

system. The program is intended for the application for technical and economical studies of thermonuclear tokamaks being developed. The description of the program is the instruction for users. (Atomindex citation 11:523512)

IAEA-CN-38/V-1 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Scope and Status of the USA Engineering Test Facility Including Relevant TFTR Research and Development.
W. R. Becraft, and P. J. Reardon. 1980, 17p
CONF-800707-20
Contract W-7405-ENG-26
International conference on plasma physics and controlled nuclear fusion research, Brussels, Belgium, 1 Jul 1980.

The vehicle by which the fusion program would move into the engineering testing phase of fusion power development is designated the Engineering Test Facility (ETF). The progress toward the design and construction of the ETF will reflect the significant achievements of past, present, and future experimental tokamak devices. Some of the features of this foundation of experimental results and relevant engineering designs and operation will derive from the Tokamak Fusion Test Reactor (TFTR) Project, now nearing the completion of its construction phase. The ETF would provide a testbed for reactor components in the fusion environment. In order to initiate preliminary planning for the ETF decision, the Office of Fusion Energy (OFE) established the ETF Design Center activity to prepare the design of the ETF. This paper describes the design status of the ETF and discusses some highlights of the TFTR R and D work. (ERA citation 05:037428)

IPP-1/171 PC **A02**/MF **A01**
Max-Planck-Inst. fuer Plasmaphysik, Garching (Germany, F.R.).
Compression Laws in the Presence of Transport and alpha -Heating in a Tokamak Plasma.
E. Minardi. Aug 79, 9p
U.S. Sales Only.

In this note formulas are given which describe the behaviour of the plasma quantities under compression in the presence of transport and alpha - heating. The deviations from adiabaticity at higher orders are calculated. The formulas are applied to the calculation of the relevant quantities in the compressions - decompressions cycles around the ignition point which allow the temperature control of an ignited plasma. Explicit formulas are given for the temperature excursions, the duration of each side of the cycle and the electric energy and power directly generated in the external coils of the controlling vertical field. The application of these results to the Zephyr experiment and to INTOR is discussed. (Atomindex citation 11:511941)

IPP-4/176 PC **A02**/MF **A01**
Max-Planck-Inst. fuer Plasmaphysik, Garching (Germany, F.R.).
Laser-Radiation Heating of Pellets.
M. Salvat. May 79, 13p
In German.
U.S. Sales Only.

A model describing the heating of pellets by laser radiation is presented. The model takes into account that the pellet material expands during the heating pulse. Thus, the supplied heat energy changes with time when the diameter of the laser beam exceeds that of the pellet at the beginning of the heating process. The equations describing the model can be integrated analytically. (Atomindex citation 11:511981)

IPP-6/189 PC **A02**/MF **A01**
Max-Planck-Inst. fuer Plasmaphysik, Garching (Germany, F.R.).
Neutral Beam Injection Calculations for Torsatrons.
D. T. Anderson, J. L. Shohet, J. A. Tataronis, and S. Rehker. Oct 79, 9p
U.S. Sales Only.

A numerical investigation of the effectiveness of neutral beam heating in two torsatron-type devices has been undertaken. A modified version of a well known deposition and orbit code was used for this purpose. It was found that, for beam currents within the applicable range of the model, neutral beams can efficiently heat either a 'classical' torsatron or an 'ultimate' torsatron plasma provided the injection is tangential to the magnetic axis. These results were obtained by following ionized test particles down to thermalization. Efficiency of the injection drops as the angle approaches perpendicular due to relatively poor containment of helically trapped orbits within the volume specified by a fixed cutoff radius. (Atomindex citation 11:515247)

ITPR-78008 PC **A04**/MF **A01**
Technische Univ., Graz (Austria). Inst. fuer Theoretische Physik und Reaktorphysik.
New Types of Nuclear Energy Concepts.
E. Ledinegg, and M. Heindler. Oct 78, 57p
CONF-780354-3
In German.Conference on emerging concepts in advanced nuclear energy systems, Graz, Austria, 29 Mar 1978.
U.S. Sales Only.

The article summarises the results of a conference on new concepts of nuclear energy, held from 29 - 31 March 1978. Principles of known systems are briefly outlined, mainly from the standpoint of neutron formation by fission, blanket breeding etc, and power production by plasma focussing and thermonuclear fusion. The new concepts include the Migma system and micro-explosions. A section is included on 'hybrid' reactors using a electronuclear source (ENQ) as neutron supply, and 'symbiotic' reactors using ENQ for fuel supply. (Atomindex citation 11:515371)

Juel-1616 PC **A02**/MF **A01**
Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Plasmaphysik.
Density Decrease in the Scrape-off Layer of the Bundle Divertor.
H. Gratzl. Aug 79, 15p
U.S. Sales Only.

A two-dimensional model is used for calculating the density decrease in the scrape-off layer of a tokamak plasma with a bundle divertor. The width of the layer is larger, if the diffusion coefficient increases in radial direction. (Atomindex citation 11:511878)

JAERI-M-8198 PC **A05**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Conceptual Studies of Plasma Engineering Test Facility.
T. Hiraoka, T. Tazima, M. Sugihara, M. Kasai, and K. Shinya. Apr 79, 94p
U.S. Sales Only.

Conceptual studies have been made of a Plasma Engineering Test Facility, which is to be constructed following JT-60 prior to the experimental power reactor. The physical aim of this machine is to examine self-ignition conditions. This machine possesses all essential technologies for reactor plasma, i.e. superconducting magnet, remote maintenance, shielding, blanket test modules, tritium handling. Emphasis in the conceptual studies was on structural consistency of the machine and whether the machine would be constructed practically. (Atomindex citation 11:511889)

JAERI-M-8205 PC **A03**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Study on Very-Low-Q Discharges in DIVA.
Apr 79, 31p
U.S. Sales Only.

Confinement and mhd characteristics of very-low-q discharges were studied in DIVA/JFT-2a. It is shown that plasmas with good confinement property are obtained with 1.3 $<=$ q sub(a) $<=$ 2 and no current disruption can be excited in discharges with q sub(a) $<$ 2. Application of the very-low-q discharges having these attractive characteristics to a large device is discussed. (Atomindex citation 11:511905)

JAERI-M-8286 PC **A06**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Second Preliminary Design of JAERI Experimental Fusion Reactor (JXFR). Interim Report.
K. Sako, T. Tone, Y. Seki, H. Iida, and H. Yamato. Jun 79, 108p
U.S. Sales Only.

Second preliminary design of a tokamak experimental fusion reactor to be built in the near future has been performed. This design covers overall reactor system including plasma characteristics, reactor structure, blanket neutronics radiation shielding, superconducting magnets, neutral beam injector, electric power supply system, fuel recirculating system, reactor cooling and tritium recovery systems and maintenance scheme. Safety analyses of the reactor system have been also performed. This paper gives a brief description of the design as of January, 1979. The feasibility study of raising the power density has been also studied and is shown as appendix. (Atomindex citation 11:511980)

JAERI-M-8289 PC **A07**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
TOPIC: A Debugging Code for Torus Geometry Input Data of Monte Carlo Transport Code.
H. Iida, and H. Kawasaki. Jun 79, 137p
In Japanese.
U.S. Sales Only.

TOPIC has been developed for debugging geometry input data of the Monte Carlo transport code. the code has the following features: (1) It debugs the geometry input data of not only MORSE-GG but also MORSE-I capable of treating torus geometry. (2) Its calculation results are shown in figures drawn by Plotter or COM, and the regions not defined or doubly defined are easily detected. (3) It finds a multitude of input data errors in a single run. (4) The input data required in this code are few, so that it is readily usable in a time sharing system of FACOM 230-60/75 computer. Example TOPIC calculations in design study of tokamak fusion reactors (JXFR, INTOR-J) are presented. (Atomindex citation 11:518689)

JAERI-M-8294 PC **A02**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Some Considerations of Ash Enrichment and Ash Exhaust by a Simple Divertor.
Y. Shimomura, K. Sako, and K. Shinya. Jun 79, 16p
U.S. Sales Only.

Some possible methods of simplifying the poloidal divertor are discussed based on results from the DIVA Experiment. A few realistic divertors, especially a simple divertor for the ash enrichment and the ash exhaust, are proposed for a fusion device of the Intor size. (Atomindex citation 11:511996)

NIIEFA-P-B-0416 PC **A02**/MF **A01**
Nauchno-Issledovatel'skii Inst. Elektrofizicheskoi Apparatury, Leningrad (USSR).
Effect of Plasma Current Breakaway on the Operating Stability of the Superconducting Coil of the Toroidal Magnetic Field in the T-10M Installation.
A. I. Kostenko, M. Yu. Kravchenko, N. A. Monoszon, and G. V. Trokhachev. 1979, 9p
In Russian.
U.S. Sales Only.

The method and calculation results of stability of a superconducting coil of the toroidal magnetic field in the T-10M installation to plasma current breakaway are presented. The calculations were performed for two values of the magnetic field induction in the centre of the plasma cross section: 3.5 and 5 T. The calculation of energy losses and heating of the superconducting coil was performed assuming the plasma current in case of breakaway decreases to zero with an infinite rate, so that the estimations obtained are maxiaum. It is shown that in case of 3.5 T induction the superconducting coil exhibits resistance to plasma current breakaways, and in case of 5 T it is necessary to use electromagnetic screening to provide stability. (Atomindex citation 11:511922)

PB81-800484 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Laser Fusion. October, 1977-October, 1980 (Citations from the NTIS Data Base).
Rept. for Oct 77-Oct 80,

George Reimherr. Nov 80, 329p
Supersedes PB80-800246, and NTIS/PS-78/1062. See also 1964-September 1977, NTIS/PS-78/1061, and October 1977-October 1980, PB81-800484.

The bibliography cites research on target fabrication, laser implosion instability, and laser produced plasma studies. (This updated bibliography contains 322 citations, 97 of which are new entries to the previous edition.)

PPPL-1701 PC **A02**/MF **A01**
Princeton Univ., NJ. Plasma Physics Lab.
Toroidal Effects on Propagation, Damping, and Linear Mode Conversion of Lower Hybrid Waves.
D. W. Ignat. Sep 80, 19p
Contract AM02-76CH03073

A common simplifying assumption made in the consideration of radio-frequency heating of tokamaks near the lower hybrid frequency is that the wave-length imposed by the coupling device parallel to the magnetic field is not modified by gradients along the field. In the present calculation, the parallel wave-length is allowed to vary, and important effects are found on wave penetration and damping if the toroidal aspect ratio (R/sub major//r/sub minor/) is less than approx. 5. The calculation shows that heating at the center of a small aspect ratio torus is inhibited by a decrease of k/sub parallel/ if waves are launched at the outside, and that it may be possible to change the plasma current via electron Landau damping with a coupler of symmetric power spectrum by placing the coupler at the top (or bottom) of the torus. (ERA citation 05:037374)

PPPL-1708 PC **A02**/MF **A01**
Princeton Univ., NJ. Plasma Physics Lab.
Bow-Shaped Toroidal Magnet Coils.
P. Bonanos. Sep 80, 9p
Contract AM02-76CH03073

A constant tension coil in which the structural pathway is of the form of an archer's bow is described. This shape suggests that demountable high field toroidal magnets magnets can be constructed with the joint at the small major radius where it is most useful. The coil tension can be used to maintain the joint in compression and ensure reliable performance. (ERA citation 05:035811)

RL-79-027 PC **A02**/MF **A01**
Science Research Council, Chilton (England). Rutherford and Appleton Labs.
Acceleration of Macro-Particles to Hyper-Velocities.
F. M. Russell. Dec 79, 12p
U.S. Sales Only.

The possibility of applying the principle of magnetic levitation to the acceleration of condensed matter to obtain hyper-velocities is examined. Condensed matter is adopted to avoid space-charge effects at high particle densities and consequently necessitates the use of cooperative phenomenon such as superconductivity or ferromagnetism to achieve coupling to applied electromagnetic fields. Since cooperative processes are relatively weak a long flight path is inevitable which suggests use of an orbital path. Conditions for stable orbital motion are derived and related problems are examined from which it is concluded that projectile velocities of 2.10 exp 7 cm sec exp -1 should be achievable with present technology. Tests with a small-scale model have verified the principles involved. The potential for application to the inertial confinement approach to controlled thermonuclear reactions is considered briefly. (Atomindex citation 11:511977)

RL-79-092 PC **A02**/MF **A01**
Science Research Council, Chilton (England). Rutherford and Appleton Labs.
Report on Impact Fusion Workshop, LASL, July 1979.
F. M. Russell. Dec 79, 13p
U.S. Sales Only.

The concept of power production from thermonuclear fusion caused by inertial confinement of D,T fuel was examined from the standpoints of overall scientific feasibility and present state-of-art in the technologies involved. No defect in principle was found but much R and D work is needed in all aspects and especially that of accelerator devices. So far only one intrinsically stable macro-particle accelerator has been proposed, based on the mixed- mu concept of stability. (Atomindex citation 11:515435)

SAND-80-1184 PC **A03**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Retention, Isotope Exchange, and Thermal Release of Hydrogen in Candidate Materials for TFTR.
W. R. Wampler, B. L. Doyle, D. K. Brice, and S. T. Picraux. Aug 80, 30p
Contract AC04-76DP00789

The materials studied included TiC, TiB sub 2 , VB sub 2 , B sub 4 C, B, Si, graphite, and the metals Ti, V, and 304L stainless steel. The TiC and TiB sub 2 were formed by chemical vapor deposition on a graphite substrate. The C/Ti ratio of the TiC was measured to be 1.0 +- .05 by ion backscattering analysis. The Ti and V were explosively bonded to copper substrates, and the VB sub 2 was made by borodizing vanadium. Carbon (compression annealed pyrolytic graphite from Union Carbide and Papyex graphite ribbon from Le Carbone) and single crystal silicon samples were included in the study as reference materials. The hydrogen retention and isotope exchange behavior for these materials were studied by measuring the amount of H or D retained as a function of incident fluence using the D(exp 3 He,P) exp 4 He nuclear reaction analysis techniques for D and H(exp 15 N, alpha gamma) profiling for H. (ERA citation 05:037450)

SAND-80-1701 PC **A03**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Ablative Response of Microdisc Targets Irradiated by 1.064 mu M Light.
J. P. Anthes, K. M. Glibert, M. A. Palmer, M. K. Matzen, and R. E. Palmer. Sep 80, 35p
Contract AC04-76DP000789
IEEE International Conference on Plasma Science, Montreal, Quebec, Canada, June 4-6, 1979.

The ablative response of microdisc targets irradiated with an 8 ns FWHM Nd:Glass laser is compared to that of infinite foils. The front surface exhaust velocity, plasma electron temperature, and size of the x-ray emitting region of Al and Fe targets irradiated with a laser intensity of 10 exp 13 to 10 exp 14 W/cm exp 2 are relatively independent of the target diameter and thickness, but the x-ray conversion efficiency (E/sub photon/ greater than or equal to 700 eV) decreases as these target dimensions decrease. These observations suggest that in this experiment: (1) lateral heat flow is not a significant factor: (2) a steady-state ablative flow at the front surface is established; and (3) two-dimensional effects lead to an increase in the density gradient or to a decrease in the average density in the vicinity of the x-ray emitting region as the target dimensions decrease. (ERA citation 05:035817)

SAND-80-2051C PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Mechanical Properties of Chemical Vapor Deposited Coatings for Fusion Reactor Application.
A. W. Mullendore, J. B. Whitley, H. O. Pierson, and D. M. Mattox. 1980, 18p CONF-801037-13
Contract AC04-76DP00789
American Vacuum Society conference, Detroit, MI, USA, 13 Oct 1980.

Chemical vapor deposited coatings of TiB sub 2 , TiC and boron on graphite substrates are being developed for application as limiter materials in magnetic confinement fusion reactors. In this application severe thermal shock conditions exist and to do effective thermo-mechanical modelling of the material response it is necessary to acquire elastic moduli, fracture strength and strain to fracture data for the coatings. Four point flexure tests have been conducted from room temperature to 2000 exp 0 C on TiB sub 2 and boron coated graphite with coatings in tension and compression and the mechanical properties extracted from the load-deflection data. In addition, stress relaxation tests from 500 to 1150 exp 0 C were performed on TiB sub 2 and TiC coated graphite beams to assess the low levels of plastic deformation which occur in these coatings. Significant differences have been observed between the effective mechanical properties of the coatings and literature values of the bulk properties. (ERA citation 05:037452)

UCID-18784 PC **A03**/MF **A01**
Lawrence Livermore National Lab., CA.
Confinement of alpha Particles in Tandem Mirrors.
R. S. Devoto, and M. Ohnishi. 8 Sep 80, 33p
Contract W-7405-ENG-48

Mechanisms leading to loss of alpha particles from non-axisymmetric tandem mirrors are considered. Stochastic diffusion due to bounce-drift resonances can cause rapid radial loss of high energy particles but can be suppressed by imposing a 20% rise in axisymmetric field before the quadrupole transition sections. With this field, radial losses due to resonances should be minimal until alpha particles near thermal energies, when they enter the resonance plateau regime. Retention in the plasma of 60 to 80% of alpha-particle energy appears possible; precise calculation requires computation of drift orbits, of which two typical examples, resonant and non-resonant, are presented. (ERA citation 05:037377)

UCRL-84052 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Mechanical Technology Unique to Laser Fusion Experimental Systems.
C. A. Hurley. 3 Sep 80, 12p CONF-800950-3
Contract W-7405-ENG-48
11. symposium on fusion technology, Oxford, UK, 15 Sep 1980.

Hardware design for laser fusion experimental machines has led to a combination of engineering technologies that are critical to the successful operation of these machines. These large opto-mechanical systems are dependent on extreme cleanliness, accommodation to efficient maintenance, and high stability. These three technologies are the primary mechanical engineering criteria for laser fusion devices. (ERA citation 05:035819)

UCRL-84278 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Technology for Large Tandem Mirror Experiments.
K. I. Thomassen. 4 Sep 80, 7p CONF-800950-4
Contract W-7405-ENG-48
11. symposium on fusion technology, Oxford, UK, 15 Sep 1980.

Construction of a large tandem mirror (MFTF-B) will soon begin at Lawrence Livermore National Laboratory (LLNL). Designed to reach break-even plasma conditions, the facility will significantly advance the physics and technology of magnetic-mirror-based fusion reactors. This paper describes the objectives and the design of the facility. (ERA citation 05:035810)

UCRL-84312 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Sustaining Neutral Beam Power Supply System for the Mirror Fusion Test Facility.
R. D. Eckard, J. H. Wilson, and H. W. Van Ness. 1980, 9p CONF-800950-5
Contract W-7405-ENG-48
11. symposium on fusion technology, Oxford, UK, 15 Sep 1980.

In late August 1978, a fixed price procurement contract for $25,000,000 was awarded to Aydin Energy Division, Palo Alto, California, for the design, manufacture, installation and acceptance testing of the Lawrence Livermore National Laboratory Mirror Fusion Test Facility (MFTF) Sustaining Neutral Beam Power Supply System (SNBPSS). This system of 24 power supply sets will provide the conditioned power for the 24 neutral beam source modules. Each set will provide the accel potential the arc power, the filament power, and the suppressor power for its associated neutral beam source module. The design and development of the SNBPSS has progressed through the final design phase and is now in production. Testing of the major sub-assembly power supply is proceeding at Aydin and the final acceptance testing of the first two power supplies at LLNL is expected to be completed this year. (ERA citation 05:035812)

UCRL-84488 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Use of Molecular Beams to Support Microspheres During Plasma Coating.
J. K. Crane, R. D. Smith, W. L. Johnson, S. A. Letts, and G. R. Korbel. 26 Aug 80, 23p CONF-801037-9
Contract W-7405-ENG-48
American Vacuum Society conference, Detroit, MI, USA, 13 Oct 1980.

Spherical laser fusion targets can be levitated on beams of Ar or other gas atoms. This is an especially useful and reliable technique for supporting microspheres during plasma coating or plasma etching. The reliability of this technique is principally the result of two things: the success of a special centering device which provides a lateral, stabilizing force on the levitated microspheres; and a gas handling system which is capable of controlling levitation gas flow in the microtorr liter/sec range. We have determined that the operational regime of this device is that of Knudsen's flow. This knowledge of the flow characteristics has been important in developing this device. (ERA citation 05:036188)

UCRL-84826 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Hybrid Reactors.
R. W. Moir. 9 Sep 80, 13p CONF-800950-6
Contract W-740ENG-48
11. symposium on fusion technology, Oxford, UK, 15 Sep 1980.

The rationale for hybrid fusion-fission reactors is the production of fissile fuel for fission reactors. A new class of reactor, the fission-suppressed hybrid promises unusually good safety features as well as the ability to support 25 light-water reactors of the same nuclear power rating, or even more high-conversion-ratio reactors such as the heavy-water type. One 4000-MW nuclear hybrid can produce 7200 kg of exp 233 U per year. To obtain good economics, injector efficiency times plasma gain (eta/sub i/Q) should be greater than 2, the wall load should be greater than 1 MW.m exp -2 , and the hybrid should cost less than 6 times the cost of a light-water reactor. Introduction rates for the fission-suppressed hybrid are usually rapid. (ERA citation 05:037438)

18B. Isotopes

AERE-R-9449 PC **A02**/MF **A01**
UKAEA Atomic Energy Research Establishment, Harwell (England). Chemistry Div.
Transport of Radioactive exp 123 Xe Gas Through a Tube Fifty Metres Long.
R. Clegg, R. Bett, and J. G. Cuninghame. Nov 79, 16p
U.S. Sales Only.

Calculations and experiments are reported which culminated in a demonstration of the feasibility of continuously transferring production quantities of exp 123 Xe gas between a target room of the Harwell Variable Energy Cyclotron, and exp 123 I processing equipment fifty metres distant. (Atomindex citation 11:525631)

CONF-800814-15 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Multigram Group Separation of Actinide and Lanthanide Elements by LiCl-Based Anion Exchange.
E. D. Collins, D. E. Benker, F. R. Chattin, P. B. Orr, and R. G. Ross. 1980, 26p
Contract W-7405-ENG-26
180. American Chemical Society meeting/2. chemical congress of the North American Continent, San Francisco, CA, USA, 24 Aug 1980.

The laboratory-scale LiCl AIX process has been successfully adapted to the multigram scale and has been used effectively in transuranium element production campaigns to separate the lanthanide fission products from the transplutonium actinides and to partition americium and curium from the heavier elements. Corrosion of the tantalum and glass equipment has been negligible. Although radiolytic gas generation has not caused a problem, radiation exposure of the Dowex 1-X10 anion exchange resin does occur significantly. However, the 1.3-L resin bed can be used successfully to process up to 3 batches, each containing 19 g of exp 244 Cm (54 W of decay heat). The chromatographic elution process is controlled by use of an alpha detector in the column effluent line and by periodic measurement of the neutron profile of the column. The development and use of feed pretreatment and operating methods has enabled effective and dependable operation. (ERA citation 05:037030)

PNL-1845-47 PC **A02**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Quarterly Report on the Strontium Heat Source Development Program, Advanced Nuclear Systems and Projects Division for April-June 1980.
H. T. Fullam. Jul 80, 10p
Contract AC06-76RL01830

Oak Ridge National Laboratory completed metallographic examination of the metal specimens from the 30,000-h compatibility tests with exp 90 SrF sub 2 . Electron microprobe analysis of the specimens is now under way. Results show that chemical attack of the 30,000-h specimens was not much greater than that observed in the 6000- to 20,000-h tests. Work continues on qualification testing of the as-fabricated prototype outer capsules. As-fabricated Hastelloy S and Hastelloy C-4 outer capsules passed the hydrostatic pressure, percussion, thermal, and thermal-quench tests without difficulty. (ERA citation 05:036193)

18C. Nuclear Explosions

AD-A091 370/7 PC **A07**/MF **A01**
SRI International, Menlo Park, CA.
Laboratory Study of Deep-Based Structures in Support of DIABLO HAWK.
Final rept. 15 Sep-31 Dec 77,
P. E. Seneny, and H. E. Lindberg. 1 Feb 78, 135p DNA-4380F
Contract DNA001-76-C-0385

Laboratory studies were performed in support of DIABLO HAWK structures and cable-hardening experiments to investigate: (1) the influence of loading rate on tunnel closure in both water-saturated and dry specimens of SRI RMG 2C2, a tuff simulant; (2) borehole collapse mechanisms and borehole/cable interaction; and (3) the influence of joints and joint orientation on the closure of circular tunnels in specimens of jointed 16A rock simulant. Results for SRI RMG 2C2 show that greater pressure must be applied in dynamic tests than in static tests to achieve a given tunnel closure. The percentage increase in pressure is twice as large for saturated specimens than for dry specimens. This larger loading rate effect in saturated specimens is due, in part, to no porewater migration and drainage in the dynamic tests. Static and dynamic borehole collapse and borehole/cable interaction test results show that springline collapse is the dominant borehole closure mechanism and that the most severe loading on the cable is from the inward motion of springline rubble. Observed critical loads for cable damage suggest that the TRW fielding ranges in DIABLO HAWK should provide the desired range of damage from none to severe.

AD-A091 371/5 PC **A06**/MF **A01**
California Research and Technology, Inc., Woodland Hills.
Investigation of a High Explosive Technique for Simulation of Local Fallout from Shallow-Buried Bursts.
Final rept. 1 Mar 78-31 Jul 79,
M. Rosenblatt, K. N. Kreyenhagen, S. H. Schuster, R. J. Schlamp, and P. J. Hassig. 1 Nov 79, 118p CRT-3220F, DNA-5149F
Contract DNA001-78-C-0169

Detonation of a shallow-buried nuclear device creates a strong shock wave in the surrounding soil, leading to formation of a crater and ejection of soil and radioactive weapon debris into the atmosphere. Predictions of local fallout depositions of this radioactive debris are important in developing tactical doctrines. Currently, predictions of local fallout from low-yield subsurface bursts in wet soils are very uncertain because the relevant nuclear tests were performed in dry alluvial soil at NTS. In this investigation, computer code numerical solutions were performed and analyzed to examine the HE Local Fallout Simulation Technique used in the Diamond Ore and Essex Tests. In this experimental technique, iridium-coated tracer particles are mixed with the HE charge. Three numerical solutions were analyzed: a 10-ton HE burst buried 6 meters in wet soil (i.e., the Essex 6MS test), a 10-ton HE burst buried 6 meters in dry alluvial soil, and a 20-ton nuclear burst buried 6 meters in dry aluvial soil. Comparisons between the solutions indicate important effects on early lofting of tracers or radioactive debris due to differences in wet vs dry soil properties and differences in HE vs nuclear sources. Good agreement was obtained between the HE/Wet Media case and the observed early lofted cloud from Essex Test 6MS.

AD-312 887 PC **A02**/MF **A01**
Aberdeen Proving Ground, MD.
Feasibility of Testing the Asfcs Vigilante for CBR Effects
F.R. CLARK. Sep 59, 15p
Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche.

No abstract available.

18D. Nuclear Instrumentation

BNL-28279 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Microchannel Plate as a Detector of Minimum Ionizing Particle.
K. Oba, P. Rehak, and S. D. Smith. 3 Sep 80, 11p CONF-800976-1
Contract AC02-76CH00016
Meeting on miniaturization of high energy physics detectors, Pisa, Italy, 18 Sep 1980.

Micro-channel plate multipliers have been used to detect the passage of relativistic charged particles. Measurements of the detection efficiency and pulse height response versus micro-channel plate gain are presented for one, two and three micro-channel plate arrays. The probability of detecting an avalanche on the detector anode per one channel of MCP crossed by the relativistic particle was calculated. Temporal response and time jitter were measured and are reported. The track images of beam particles crossing the detector are shown. (ERA citation 05:037106)

COO-3071-249 PC **A02**/MF **A01**
Pennsylvania Univ., Philadelphia.
New Type of Cherenkov Imaging Detector.
B. Robinson. May 80, 9p CONF-800684-5
Contract AC02-76ER03071
International conference on experimentation at LEP, Uppsala, Sweden, 16 Jun 1980.

An imaging Cherenkov counter is being developed to measure the velocities of several secondary particles simultaneously over wide ranges in gamma (gamma identical with E/m), 20 < gamma < 100, and in particle angles (200 mrad x 200 mrad per unit). This detector, called the ORCID (Optical Readout Cherenkov Imaging Detector) is distinguished from other CID's by its readout system, which uses a lens to refocus and reduce a mirror image onto an image intensifier. The image intensifier is in turn coupled to an optical CCD array. An ORCID is being developed for use in Fermilab experiment E-609, a hadron jet experiment, and may have other applications. (ERA citation 05:037107)

IFVE-OEA-78-141 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Serpukhov. Inst. Fiziki Vysokikh Energii.
Data Preparation on the PDP-9 for Input in the Geometric Reconstruction Program.
Yu. A. Belokopytov, and Yu. S. Nechaev. 1978, 8p

In Russian.
U.S. Sales Only.

The algorithm of the program of production of reference points for tracks, filtered off in the process of on-line processing at a spiral reader digitizer is described. The program is realized on a PDP-9 computer. The package of standard programs of extended mathematical software for the PDP-9 contain subprograms of square root calculation and of transformation from the cartesian coordinate system into the polar one and the subprogram of the linear equation system solution as well. This package of programs occupies a volume of internal storage equal to 0.7 K. The program of reference point calculation itself occupies 0.8 K. The result of the on-line processing program operation is a magnetic tape with measuring information in the form of data file and of optional blocks. Three films obtained from the "Mirabelle" chamber in a K exp - p experiment at 32 keV/c with the general number of vertexes of 1016 have been processed according to the described program. The per cent of going through the geometrical program in relation to the vertexes really measured (948 vertexes) constituted 90%. (Atomindex citation 11:523506)

INIS-mf-5426 PC **A02**/MF **A01**
Bandung Reactor Center (Indonesia).
Dosemeter Reader.
Z. Santoso, and S. Yatim. 1977, 5p CONF-7710233-(V.2)
In Indonesian.Workshop on physics, nuclear instrumentation and isotope production, Bandung, Indonesia, 17 Oct 1977.
U.S. Sales Only.

The dosemeter system based on light dependent resistor (LDR) has been designed. Light intensities are transmitted by the dosemeter, detected by LDR sensor, and than the resistance variations are measured by a Wheatstone bridge in z-70 Kilo Ohm, with +- 0.1% occuration. The system is simple, cheap and can be used for optical density variation of density of materials. (Atomindex citation 11:528887)

INIS-mf-5448 PC **A07**/MF **A01**
Atominstitut der Oesterreichischen Univ. Vienna.
Measurement of the Neutron Flux Density in Nuclear Reactors and Development of a Self-Powered Neutron Detector.
Thesis (Univ. Doz.),
H. Boeck. Apr 78, 146p
In German.
U.S. Sales Only.

Based on the experience with commercial in-core neutron detectors a new detector was developed and tested. This detector actually combines the advantages of both fission chambers and self-powered neutron detectors without any new or unknown disadvantages. Opposite to standard self-powered neutron detectors the detector signal results not from electrons but from fission fragments being transferred from an emitter made of 93% enriched uranium through an isolator to a collector and producing a neutron flux density proportional signal in an external circuit. The sensitivity of this detector exceeds the sensitivity of a typical Co-detector for a factor of about 50. (Atomindex citation 11:518233)

JINR-13-12385 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems.
Beam Monitoring System on the Base of Proportional Chambers for the PION Setup.
Yu. K. Akimov, V. A. Krasnov, and A. B. Kurepin. 1979, 16p
In Russian.
U.S. Sales Only.

Some characteristics of proportional multiwire chambers 128 x 128 mm exp 2 in size and their application for wide aperture particle beam monitoring are described. Chamber signal wires with a winding step of 2 mm are united in groups with wire numbers from 1 to 13. The chambers are simple design and a relatively low noise. Electronic units created for chamber are considered. Tests indicated that chamber characteristics do not depend on a number of wires in a group. The system described operates in real time. (Atomindex citation 11:528783)

JINR-13-12452 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
Calculation of Parameters of Optimum Adjustment Controllers Stabilizing the "Lyudmila" Chamber Regime.
V. I. Kireev, V. T. Tolmachev, and Yu. V. Khrenov. 1979, 17p
In Russian.
U.S. Sales Only.

Some problems of optimization of controller parameters stabilizing temperature and pressure of "Lyudmila" chamber workina liquid are considered. Methods of calculating parameters of adjustment tested on the setup are given. It is shown that the control process quality under calculated parameters satisfies the conditions given. (Atomindex citation 11:528856)

JINR-13-12631 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems.
On-Line System for Testing Cylindrical Proportional Chambers.
V. A. Baranov, N. I. Zhuravlev, and A. S. Korenchenko. 1979, 11p
In Russian.
U.S. Sales Only.

System for testing cylindrical proportional and recording electronics chambers is described. The electronics is carried out on the base of a large hybrid integrate circuit. The data is readout serially from groups containing 32 triggers, is converted into binary code and transferred to the M-6000 computer. The data obtained after handling is put on a display or a printer. The usage of this set-up allows one to accelerate and simplify chamber testing. (Atomindex citation 11:528798)

KFKI-1979-95 PC **A02**/MF **A01**
Kozponti Fizikai Kutato Intezet, Budapest (Hungary).
International Intercomparison of Whole Body Counters.
A. Andrasi, and E. Beleznay. Jan 80, 15p
U.S. Sales Only.

An international intercomparison of whole-body counters with the participation of 7 laboratories from 5 member countries was organized in 1976 by the Consultative Scientific and Technical Council for Radiation Protection of the CMEA. The Health Physics Department of the Central Research Institute for Physics also participated in this intercomparison. The main aim of the participation was to check our calibration method, measuring and evaluation procedures to determine their suitability for routine measurements and to investigate the advantages and drawbacks of applying different measuring geometries and evaluation methods. The final results of the intercomparison including our data in more detail are shown in the paper. The results obtained for different measuring geometries, evaluation methods and phantom sizes applying a simple calibration procedure are also given. The results show that a simplified calibration method using point sources embedded in an elliptic cylinder shaped scattering medium and a computerized least square fitting procedure in the evaluation of measurements combine to yield a final accuracy of +-15% in the gamma energy range of 250-1500 keV assuming uniformly distributed sources, a wide range of body sizes, and the choice of a particular measuring geometry. (Atomindex citation 11:528791)

KFTI-79-3 PC **A02**/MF **A01**
Akademiya Nauk URSR, Kharkov. Fiziko-Tekhnicheskii Inst.
Automatic Data Processing from Optical Spark Chambers in Polarization Experiments.
A. A. Zybalov, A. S. Bratashevskii, V. R. Nazyrov, V. V. Fedorova, and A. I. Derebchinskii. 1979, 12p
In Russian.
U.S. Sales Only.

A system was described for film data processing from a spark chamber telescope; the system was created on the basis of the PAD-2 semiautomatic decoders on-line with a computer. The following characteristics were obtained in the course of operation: coordinate measurement accuracy is 0.5 mm, the error in measuring the polar and azimuthal angles of proton-carbon scattering is 0.8-0.9 deg and 1.7-4.3 deg respectively. The failine number in the system operation does not exceed 10%. The PAD-computer measurement system may be used when operating with any graphical data if the coordinate measurement accuracy satisfies the processing requirements. (Atomindex citation 11:528911)

KFTI-79-6 PC **A02**/MF **A01**
Akademiya Nauk URSR, Kharkov. Fiziko-Tekhnicheskii Inst.
Electronic Units for Data Output from the Telescope of Magnetostriction Spark Chambers.
A. I. Derebchinskii, A. A. Zybalov, O. G. Konovalov, V. N. Skusinets, and A. Eh. Tenishev. 1979, 9p
In Russian.
U.S. Sales Only.

The electronic system is described for connection of a magnetostriction wire spark chamber telescope with a computer; the system ensures coordinate measurement accuracy up to 0.5 mm at 48 sparks. The system comprises a discriminator - amplifier, a "time-code" converter, a decoder, and a supply unit. The basic circuits and specifications of the above-mentioned units are presented. The units are manufactured on the basis of integrated circuits and are intended for data preparing and transmission to computers of various modifications. (Atomindex citation 11:528821)

KFTI-79-8 PC **A02**/MF **A01**
Akademiya Nauk URSR, Kharkov. Fiziko-Tekhnicheskii Inst.
Gas Supply System for the "Electron" Installation.
Yu. M. Arkatov, V. P. Borovlev, P. I. Vatset, V. I. Voloshchuk, and E. A. Gavrilichev. 1979, 8p
In Russian.
U.S. Sales Only.

The investigation results are described on a system for purifying and controlling the working gas of a helium streamer chamber operating on a bean of a electron linear accelerator. Maximum pressure in the system is 2 atm, and productivity at continuous helium circulation is 0.2 m exp 2 /hr. A chromatograph is used for determining the qualitative and quantitative composition of the gas. A gas-discharge cell is used for remote continuous control. Under operating conditions, the air impurity in the streamer chamber does not exceed 0.05%. (Atomindex citation 11:528792)

PNL-SA-8753 PC **A02**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Experimental Considerations for the Calibration of Personnel Dosimeters with Photons.
C. D. Hooker, R. C. Yoder, and J. W. Courtney. 4p
Contract AC06-76RL01830

The criteria for irradiating radiation dosimeters for test purposes are defined quite clearly in Draft ANSI Standard N13.11. In this Draft the use of phantoms, constructed of a near tissue equivalent material, is prescribed for backing the dosimeters while being irradiated, thus simulating a dosimeter being irradiated while attached to a person. When the phantom is placed in the photon beam it becomes a major source of scattered radiation. The scatter component into the dosimeter is a function of the energy of the photon beam and must be defined for each effective energy used. In addition, it is usually cost effective to irradiate more than one dosimeter at the same time, which may result in mutual interference from the dosimeters themselves. The effects of these parameters upon a centrally positioned dosimeter in the presence of a phantom are studied. (ERA citation 05:037101)

PPGM-L-166-78 PC **A03**/MF **A01**
Gama Research Centre, Jogyakarta (Indonesia).
Possibility of the Use of PVC Plastics as a Ray Dosemeter.
1978, 28p
In Indonesian.
U.S. Sales Only.

The use of plastics as a radiation dosemeter for measurement of gamma -rays is very attractive to

study. In the work commercial PVC film with the trade-mark "Takiron" is used for Co-60 radiation dosimetry. According to the experiments the useful dose range extends over 0.15-1.2 Mrads. Fading of the coloration with time after radiation exposure can be stabilised by heat treatment (60 deg C for 30 minutes). (Atomindex citation 11:528790)

RL-79-079 PC **A02**/MF **A01**
Science Research Council, Chilton (England). Rutherford and Appleton Labs.
Imaging of Hard X-Rays with sub-Millimetre Spatial Resolution by Means of a Xenon Filled MWPC.
J. E. Bateman, and J. F. Connolly. Nov 79, 17p
U.S. Sales Only.

Results are presented showing that a beam of Eu K X-rays (41.5 keV) from a exp 153 Gd source can be imaged in a xenon filled (NTP) MWPC with sub-millimetre spatial resolution. In the best case (at low data rates) the predicted physical limit of 0.5 mm fwhm is observed. (Atomindex citation 11:514449)

18E. Nuclear Power Plants

DP-MS-79-78 PC **A02**/MF **A01**
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab.
Seismic Response Analysis for Structures with Non-Orthogonal Modes.
W. F. Yau. 1980, 9p CONF-800804-21
Contract AC09-76SR00001
ASME century 2 emerging technology conference, San Francisco, CA, USA, 10 Aug 1980.

For seismic analysis of structures in nuclear industry, the spectrum method of modal combination acceptable to US Nuclear Regulatory Commission is applicable only to systems with orthogonal natural modes. When a structure with frequency dependent boundary conditions is set in motion, its natural modes of vibration are generally non-orthogonal. Based on such a structure, the spectrum method of modal composition is generalized to include systems with non-orthogonal modes. The generalized expression for the participation factor of each model is reducible to that prescribed by NRC, when the natural modes of the system are orthogonal. To illustrate the generalized method, the model responses of a simple structure are analyzed in detail. (ERA citation 05:034936)

IAEA-217 PC **A11**/MF **A01**
International Atomic Energy Agency, Vienna (Austria).
International Inventory of Training Facilities in Nuclear Power and Its Fuel Cycle 1978.
1979, 243p
U.S. Sales Only.

The revised inventory is arranged according to the following subject areas: nuclear power plant (NPP) engineering, nuclear safety, quality assurance, NPP operation and maintenance, NPP instrumentation and control, nuclear fuel management, nuclear materials control. Training in each subject area is classified into five groups depending on the type of organization offering the training courses. Each course is briefly described by its name or purpose, institution and location, duration, frequency, language, and content. (Atomindex citation 11:518707)

NUREG-0662-V-2 PC **A23**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Office of Nuclear Reactor Regulation.
Decontamination of the Three Mile Island Unit 2 Reactor Building Atmosphere (Final Environmental Assessment). Volume 2.
Final staff rept.
Jun 80, 539p
See also Volume 1, NUREG-0662-V-1.

In March 1980 the NRC staff published the draft version of this Final Environmental Assessment (NUREG-0662) and two subsequent Addenda for public comment. The staff received approximately 800 comments on the draft Environmental Assessment. Of these, approximately 195 responses generally supported purging krypton from the reactor building, approximately 500 opposed it, and the remaining responses were either recommended alternatives for removing the krypton or comments that took no position on the staff's recommendation. This volume of the Final Environmental Assessment contains copies of letters and reports that suggested either decontamination alternatives or that in some way commented on one or more alternatives proposed in the draft Environmental Assessment. Also included in this volume are representative letters either opposed to or in favor of purging krypton from the reactor building. These letters come from private citizens and groups, from the business and professional community, and from local, State, and Federal officials and organizations.

ORNL/TM-7279 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Nuclear Power Generation Cost Methodology.
J. G. Delene, and H. I. Bowers. Aug 80, 38p
Contract W-7405-ENG-26

A simplified calculational procedure for the estimation of nuclear power generation cost is outlined. The report contains a discussion of the various components of power generation cost and basic equations for calculating that cost. An example calculation is given. The basis of the fixed-charge rate, the derivation of the levelized fuel cycle cost equation, and the heavy water charge rate are included as appendixes. (ERA citation 05:034927)

PB81-120883 PC **A05**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
Probabilistic Assessment of Tornado-Borne Missile Speeds.
Final rept.,
Emil Simiu, and Martin R. Cordes. Sep 80, 88p
NBSIR-80-2117
Sponsored in part by Nuclear Regulatory Commission, Washington, DC. Errata sheet inserted.

A procedure was developed for estimating speeds with which postulated missiles hit any given set of targets in a nuclear power plant or similar installation. Hit speeds corresponding to probabilities of occurrence of .0000001 were calculated for a given nuclear power plant under various assumptions concerning the magnitude of the force opposing missile take-off, direction of tornado axis of translation, number and location of missiles, and size of target area. The results of the calculations are shown to depend upon the parameters: CDA/m, where CD = drag coefficient, A = projected area, m = mass of missiles, and the ratio, k, between the minimum aerodynamic force required to cause missile take-off, and the weight of the missile.

18F. Radiation Shielding and Protection

CEA-CONF-4673 PC **A03**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Service de Protection contre les Rayonnements.
Production and Attenuation of Neutrons Created by Protons, Deuterons and Alphas of GeV Energy in Shielding Concretes.
H. Quechon, and A. Leleux. 1979, 33p
In French.
U.S. Sales Only.

Some results are given relating to the production and attenuation of neutrons created by beams of light ions (exp 1 H to exp 4 He) with an energy of the GeV range interacting in shielding concretes. (Atomindex citation 11:517965)

CEA-CONF-4793 PC **A02**/MF **A01**
CEA Centre d'Etudes de Bruyeres-le-Chatel, Montrouge (France).
Calibrated Monoenergetic Neutron BEAMS. Measurement Techniques of Neutron Flux.
G. Grenier. 1979, 24p
In French.Meeting on the metrology of ionizing radiations, Paris, France, 15 - 16 May 1979.
U.S. Sales Only.

Monoenergetic neutrons with energy ranging between 0.03 and 20 MeV are produced with Nuclear Physics Division accelerators at Bruyeres-le-Chatel. Features of neutron sources are presented. Neutron flux methods used are described. Intercomparison measurements of these methods are also presented. (Atomindex citation 11:525664)

CEA-R-5003 PC **A03**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Div. d'Etude et de Developpement des Reacteurs.
Problem of the Black Plate with Zero Thickness and Finite Width in Neutron Transport Theory.
P. Benoist. Aug 79, 27p
In French.
U.S. Sales Only.

A black plate with zero thickness, finite width and infinite height, imbedded in an infinite and homogeneous medium which scatters and absorbs neutrons, is considered. The problem is time-independent and the neutrons, which are supposed to have a unique speed, are issued, either from a current at infinity (problem A), or from a uniform source (problem B). It is shown that the C/sub N/ method seems to be particularly well suited to the resolution of this 'two-dimensional Milne problem'. A particular interest is attached to the determination of the radius R of the black cylinder leading to the same polar behavior of the flux at infinity as the plate (criterion 1), or absorbing the same number of neutrons as the plate (criterion 2). In this preliminary report, values of R are calculated in various limit cases: the width of the plate being taken equal to one, l being the mean free path and c the number of secondaries per collision in the outer medium, R is calculated at first in the limit l implies 0 (for c = 1) by the theory of Muskhelishvili, and then in the limit l implies infinity (whatever c is) and c implies 0 (whatever l is). In the limit c implies 1 (whatever l is), R is shown to be the same in problems A and B and criteria 1 and 2. On the other hand, whatever l and c are; the values of R obtained in the problem A with the criterion 2 and in the problem B with the criterion 1 are shown to be equal. All these results allow henceforth a reasonable interpolation which can be useful in the practice. (Atomindex citation 11:512385)

CONF-800942-2 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Status of Reactor-Shielding Research in the US.
F. C. Maienshein. 1980, 17p
Contract W-7405-ENG-26
ANS topical meeting on 1980 advances in reactor physics and shielding, Sun Valley, ID, USA, 14 Sep 1980.

While reactor programs change, shielding analysis methods are improved slowly. Version-V of ENDF/B provides improved data and Version-VI will be cost effective in advanced fission reactors are to be developed in the US. Benchmarks for data and methods validation are collected and distributed in the US in two series, one primarily for FBR-related experiments and one for LWR calculational methods. For LWR design, cavity streaming is now handled adequately, if with varying degrees of elegance. Investigations of improved detector response for LWRs rely upon transport methods. The great potential importance of pressure-vessel damage is dreflected in widespread studies to aid in the prediction of neutron fluences in vessels. For LMFBRS, the FFTF should give attenuation results on an operating reactor. For larger power reactors, the advantages of alternate shield materials appear compelling. A few other shielding studies appear to require experimental confirmation if LMFBRs are to be economically competitive. A coherent shielding program for the GCFR is nearing completion. For the fusion-reactor program, methods verification is under way, practical calculations are well advanced for test devices such as the TFTR and FMIT, and consideration is now given to shielding problems of large reactors, as in the ETF study. (ERA citation 05:036644)

CONF-800942-3 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.

Radiation Protection and Shielding Standards for the 1980S.
D. K. Trubey, and 1980, 5p
Contract W-7405-ENG-26
ANS topical meeting on 1980 advances in reactor physics and shielding, Sun Valley, ID, USA, 14 Sep 1980.

The American Nuclear Society (ANS) is a standards-writing organization member of the American National Standards Institute (ANSI). The ANS Standards Committee has a subcommittee denoted ANS-6, Radiation Protection and Shielding, whose charge is to develop standards for radiation protection and shield design, to provide shielding information to other standards-writing groups, and to develop standard reference shielding data and test problems. This paper is a progress report of this subcommittee. Significant progress has been made since the last comprehensive report to the Society. (ERA citation 05:036664)

JAERI-M-8238 PC **A03**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Development of a Three-Dimensional Neutron Diffusion Code Series by Leakage Iterative Method.
Y. Naito. May 79, 29p
U.S. Sales Only.

In nodal and coarse mesh methods, one of the most difficult problems is to estimate neutron leakage from a subregion because spatial mesh widths are too wide to evaluate the neutron current at the boundary of the subregion accurately. To eliminate this difficulty, a leakage iterative method is proposed and several computer codes have been developed. The contents of these codes are briefly shown. (Atomindex citation 11:514751)

18G. Radioactive Wastes and Fission Products

AECB-1116 PC **A03**/MF **A01**
Atomic Energy Control Board, Ottawa (Ontario).
Radioactive Waste Management: Yesterday, Today and Tomorrow.
A. T. Prince. Oct 77, 26p
U.S. Sales Only.

The public believes that there is a radioactive waste problem, but knowledge in the field is so well advanced that the only problem left is how to choose the most economically effective method among many available. Tailings from uranium ore processing could be made harmless by removing the majority of the radium and storing the remaining waste in well-designed retention areas. Nonfuel reactor wastes may be handled by incineraton, reverse osmosis, and evaporation in a central waste management centre. The dry storage of spent fuel in concrete cannisters is being investigated. Ultimate disposal of high-level wastes will be in deep, stable geologic formations. (Atomindex citation 11:529044)

AECL-6544 PC **A02**/MF **A01**
Atomic Energy of Canada Ltd., Chalk River (Ontario). Chalk River Nuclear Labs.
Recovery of Tritium from CANDU Reactors, Its Storage and Monitoring of Its Migration in the Environment.
W. J. Holtslander, R. V. Osborne, and T. S. Drolet. Jul 79, 18p
U.S. Sales Only.

Tritium is produced in CANDU heavy water reactors mainly by neutron activation of deuterium. The typical production rate is 2.4 kCi per megawatt-year (89 TBq. per megawatt-year. In Pickering Generating Station the average concentration of tritium in the moderators has reached 16 Ci.kg exp -1 (0.6 TBq.kg exp -1) and in coolants, 0.5 Ci.kg exp -1 (0.02 TBq.kg exp -1). Concentrations will continue to increase towards an equilibrium determined by the production rate, the tritium decay rate and heavy water replacement. Tritium removal methods that are being considered for a pilot plant design are catalytic exchange of DTO with D sub 2 and electrolysis of D sub 2 O/DTO to provide feed for cryogenic distillation of D sub 2 /DT/T sub 2 . Storage methods for the removed tritium - as elemental gas, as metal hydrides and in cements - are also being investigated. Transport of tritiated wastes should not be a particularly difficult problem in light of extensive experience in transporting tritiated heavy water. Methods for determining the presence of tritium in the environment of any tritium handling facility are well established and have the capability of measuring concentrations of tritium down to current ambient values. (Atomindex citation 11:523342)

AERE-M-3063 PC **A02**/MF **A01**
UKAEA Atomic Energy Research Establishment, Harwell (England). Theoretical Physics Div.
Enhanced Diffusion and Related Phenomena in Solids Containing Active Species.
A. M. Stoneham. Jan 80, 13p
U.S. Sales Only.

Much recent work on semiconductors has shown that diffusion and related processes can be vastly enhanced by the presence of free carriers (i.e. electrons and holes). In some cases quite different mechanisms take over. This note discusses two possible effects of ionisation in waste-disposal glasses, namely (1) the enhanced motion of alkalis by changes of charge state and (2) enhanced segregation through ionisation-induced electric fields near surfaces and interfaces. Both appear to be unimportant for the activity levels expected for HARVEST glasses. (Atomindex citation 11:529052)

BARC-1028 PC **A03**/MF **A01**
Bhabha Atomic Research Centre, Bombay (India).
Development of Suitable Vitrified Radioactive Waste Products with Low Formation Temperatures and Improved Leach Resistance - a Practical Approach.
G. A. Vaswani, P. B. Jahagirdar, R. C. Rastogi, and N. S. Sunder Rajan. 1979, 31p
U.S. Sales Only.

In contrast to normal practice of employing theoretical considerations, a scheme based on practical approach has been evolved for the development of suitable glass compositions to produce vitrified radioactive wastes with low forming temperatures of around 1000degC and low leach rates of the order of 10 exp -5 to 10 exp -6 gm cm exp -2 d exp -1 . After fixing the percentage of the waste content at a moderate value, a number of formulations in the sodium borosilicate system are studied for their melting and leaching characteristics by simple and quick laboratory techniques. Based on the results, a composition with scope for further lowering of melting temperature and improvement in product durability is subjected to the introduction of different durability enhancing and/or melting temperature lowering oxides as well as the waste oxides so as to obtain an optimum composition. This composition is further subjected to variations in its Na sub 2 O, Ba sub 2 O sub 3 and SiO sub 2 content to get a region of compositions with optimum leaching and melting characteristics. A composition selected from the central portion of this region will retain its properties even if the proportion of waste oxides and glass forming additives vary during the commercial production of vitrified radioactive wastes. (Atomindex citation 11:518442)

BARC-1032 PC **A03**/MF **A01**
Bhabha Atomic Research Centre, Bombay (India).
Development of Improved Leaching Techniques for Vitrified Radioactive Waste Products.
G. A. Vaswani, R. G. Yeotikar, R. C. Rastogi, and N. S. Sunder Rajan. 1979, 36p
U.S. Sales Only.

A critical review of the current techniques for evaluating the leach resistance of vitrified radioactive wastes has been made. Inadequacy of the available leaching techniques, with respect to their adoption as standard technique on an international scale, has been brought out for the three broad categories of aqueous attack viz., (i) simple contact with leachant at a particular temperature, (ii) once-through or recirculatory flow of leachant at variable temperatures and flow rates, and (iii) contact with freshly distilled hot water in soxhelet type of extractor. In an effort to evolve a standard leaching technique in the latter two categories of aqueous attack, development of two leaching units viz., 'Dynamic Leaching Unit' and 'Modified Soxhlet Unit' is described. Both these units offer good control and wide flexibility on the important parameters affecting leaching such as leachant temperature, flow rate of residence time of leachant and ratio of leachant volume to sample surface area. The dynamic leaching units also offers a good control and flexibility on the two additional parameters viz., the composition and pH of the leachant. In the modified soxhlet unit the composition and pH of the leachant remains near to that of distilled water. The leach rate results have been found to be reproducible. A need for framing the set of standard conditions for adoption of these units in evolution of standard leaching techniques has been indicated. (Atomindex citation 11:518315)

BNL-28282 PC **A03**/MF **A01**
Brookhaven National Lab., Upton, NY.
APEX Accelerator Cycle for Transmutation of Long-Lived Fission Wastes.
J. Powell, M. Steinberg, H. Takahashi, P. Grand, and T. Botts. 1980, 30p CONF-800743-11
Contract AC02-76CH00016
International conference on nuclear waste transmutation, Austin, TX, USA, 22 Jul 1980.

Based on preliminary studies, some conclusions can be drawn concerning the Accelerator Fuel Enricher and Fission Product Exterminator (APEX). APEX-1 and APEX-2 systems can destroy TU's, exp 137 Cs, and exp 90 Sr at acceptable cost and efficiency. The principal difference between APEX-1 and APEX-2 is the in-reactor and in-circuit inventory of exp 137 Cs and exp 90 Sr. Stable and low hazard wastes can be disposed of by burial. Accelerator breeders can effectively sustain a fission reactor economy indefinitely. Military waste can be blended into commercial fuel cycle for transmutation. Accelerator and target technologies appear practical and could be developed in a few years. More detailed studies are needed to better define the technical and economic features of the LAFER and APEX cycles, so that comparative assessments can be made between these cycles, as well as with other transmutation and waste disposal concepts. (ERA citation 05:036102)

CEA-CONF-4677 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Service de Protection contre les Rayonnements.
Collect and Treatment of Radioactive Wastes in Low Activity Laboratories.
J. Cluchet, and J. Desroches. 1979, 6p CONF-790181-5
In French.SFRP session on safety in handling of low activity unsealed sources, Fontenay-aux-Roses, France, 17 Jan 1979.
U.S. Sales Only.

Afer recalling regulations concerning unsealed sources and low activity wastes produced by hospitals and biological laboratories, practical application of these rules is described. Sorting, storage and treatment of the different kind of wastes: solid, liquid, inactive, active of long or short life, containers to be used are examined. (Atomindex citation 11:523258)

DOE/NE-0010 PC **A02**/MF **A01**
Department of Energy, Washington, DC. Assistant Secretary for Nuclear Energy.
Spent Nuclear Fuel: A Comparison of at-Reactor Basin Storage and Away-from-Reactor Storage.
Jul 80, 25p

A nuclear power reactor operator, confronted with rising spent fuel inventories that would soon exceed storage capacity, has several options to remedy this situation: transshipment, reracking of existing at-reactor storage basins (ARB), new ARB's, and away-from-reactor (AFR) basins. This report examines the latter two cases where a macro-economic comparison of each storage system is developed. The AFR storage system proved to be significantly more economical. This analysis indicates that 46 ARB's would be needed to meet storage requirements compared to only three AFR's. The total discounted costs associated with building new ARB's and AFR's are $4.7 billion and $1.2 billion respectively. (ERA citation 05:034596)

DP-MS-80-24 PC **A02**/MF **A01**
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab.
Economics of Spent LWR Fuel Storage.
H. J. Clark, and G. F. O'Neill. 1980, 6p CONF-800901-1
Contract AC09-76SR00001
Symposium on intermediate range atmospheric transport processes and technology assessment, Gatlinburg, TN, USA, 29 Sep 1980.

A power reactor operator, confronted with rising spent fuel inventories that would soon exceed his storage capacity, has to decide what to do with this fuel if he wants to continue reactor operations. A low cost option would be to ship excess fuel from the overburdened reactor to another reactor in the utility's system that has available space. The only cost would be for cask leasing and shipping. Three other alternatives all require considerable capital expenditures: reracking, new at-reactor (AR) basins for storage, and away-from-reactor (AFR) basins for storage. Economic considerations for each of the alternatives are compared. (ERA citation 05:034901)

DP-MS-80-31 PC **A02**/MF **A01**
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab.
Licensing of Away-from-Reactor (AFR) Installations.
P. L. Gray. 1980, 18p CONF-800943-9
Contract AC09-76SR00001
National topical meeting of fuel cycles for the 80's, Gatlinburg, TN, USA, 29 Sep 1980.

Storage of spent fuel at Away-From-Reactor (AFR) installations will allow reactors to continue to operate until reprocessing or other fuel disposal means are available. AFR installations must be licensed by the Nuclear Regulatory Commission (NRC). Although wide experience in licensing reactors exists, the licensing of an AFR installation is a relatively new activity. Only one has been licensed to date. This paper delineates the requirements for licensing an AFR installation and projects a licensing schedule. Because the NRC is developing specific AFR requirements, this schedule is based primarily on draft NRC documents. The major documents needed for an AFR license application are similar to those for a reactor. They include: a Safety Analysis Report (SAR), and Environmental Report (ER), safeguards and security plans, decommissioning plans, proposed technical specifications, and others. However, the licensing effort has one major difference in that for AFR installations it will be a one-step effort, with follow-up, rather than the two-step process used for reactors. The projected licensing schedule shows that the elapsed time between filing an application and issuance of a license will be about 32 months, assuming intervention. The legal procedural steps will determine the time schedule and will override considerations of technical complexity. A license could be issued in about 14 months in the absence of intervention. (ERA citation 05:036089)

ENICO-1048 PC **A02**/MF **A01**
Exxon Nuclear Idaho Co., Inc., Idaho Falls.
Characterization of Vitrified ICPP Alumina Waste Calcine.
H. S. Cole, J. R. Brotzman, and G. G. Simpson. Aug 80, 24p
Contract AC07-79ID01675

The properties of one borosilicate and two borophosphate glasses previously developed to vitrify an ICPP alumina nuclear waste calcine are determined. Based on melt viscosity at 1100 exp 0 C and leach rate, the maximum permissible calcine contents in the borophosphate and borosilicate formulations are 26 and 16 mol%, respectively. Glasses containing lesser amounts of calcine do not develop crystalline compounds upon annealing. Based upon the same viscosity and leach rate criteria, 40 wt % CaO or zirconia calcine can be substituted for alumina calcine in the borophosphate glasses. Ten wt % of either additive can be substituted for alumina calcine in the borosilicate glass. Minor modifications of the alkali or cupric oxide content in the borophosphate glasses does not alter glass characteristics. (ERA citation 05:035185)

GA-A-15916 PC **A02**/MF **A01**
General Atomic Co., San Diego, CA.
End of Life Fission Product Distributions in F-1 Experiment Fuel Rods.
D. T. Goodin, S. Langer, and W. E. Bell. May 80, 20p CONF-800648-13
Contract AT03-76SF71023
GCFRP program technical review meeting, San Diego, CA, USA, 4 Jun 1980.

Fission product migration and end-of-life distributions were examined in the F-1 (X094) series of sealed, mixed-oxide fuel rods irradiated in the fast flux of EBR-II. Cesium, rubidium, iodine, and strontium data obtained from axial gamma scanning, mass spectrometry, and radiochemical analyses are presented. The results show significant migration of cesium, probably as both a volatile species and as the noble gas precursor. Cesium metal species leaving the fuel region accumulate predominately at the fuel-blanket interface. Volatile cesium reaching the fission product traps is readily sorbed by the charcoal. (ERA citation 05:036660)

HEDL-SA-2064 PC **A04**/MF **A01**
Los Alamos Scientific Lab., NM.
Combustible Radioactive Waste Treatment by Incineration and Chemical Digestion.
L. A. Stretz, M. D. Crippen, and C. R. Allen. 28 May 80, 60p CONF-800802-16
Contracts W-7405-ENG-36, AC14-76FF0217
89. annual meeting of the American Institute of Chemical Engineers, Portland, OR, USA, 17 Aug 1980.

A review is given of present and planned combustible radioactive waste treatment systems in the US. Advantages and disadvantages of various systems are considered. Design waste streams are discussed in relation to waste composition, radioactive contaminants by amount and type, and special operating problems caused by the waste. (ERA citation 05:034599)

IAEA-R-1710-F PC **A03**/MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Collection of gamma Spectra Data and Correlated Isotopic Data of Irradiated Mixed Oxide Fuel and Study of the Applicability for Safeguards. Final Report for the Period 1 December 1975 - 31 March 1979.
H. Natsume. Jan 80, 45p
U.S. Sales Only.

Gamma-ray spectrum data were obtained by means of non-destructive measurements with a Ge(Li) detector and associated equipment set up in a spent fuel storage pool at JPDR on a PuO sub 2 - UO sub 2 fuel rod taken out of an instrumented fuel assembly, IFA-159, which had been irradiated in the Halden Boiling Water Reactor (HBWR). Calibration of the non-destructive measurement was made based on the results of the destructive chemical analysis carried out on the ten samples. The chemical analysis results about uranium, neptunium, plutonium, americium, curium, neodymium and the gamma-ray emitting fission products are presented, as well as the values of burnup determined from those results. Procedures of the chemical analysis are also described in details. (Atomindex citation 11:523484)

INFCE/DEP/WG-7/10 PC **A02**/MF **A01**
INFCE (Sweden).
Intermediate Storage Facility for Vitrified High Level Waste from the Reprocessing of Spent Nuclear Fuel.
Apr 78, 13p
U.S. Sales Only.

An intermediate storage facility for vitrified high level waste is described. The design was made specifically for Swedish conditions but can due to modular design be applied also for other conditions. Most of the plant is located underground with a rock cover of about 30 m in order to provide protection against external forces such as acts of war and sabotage. The storage area consists of four caverns each with 150 pits. Each pit can take 10 waste cylinders of 0.4 m diameter and 1.5 m length containing 150 liters of glass. The capacity can be increased by adding additional caverns. Cooling is obtained by forced air convection. Reception areas, auxiliary systems and operation of the plant are also described. (Atomindex citation 11:529023)

INFCE/DEP/WG-7/16 PC **A09**/MF **A01**
INFCE (USA).
Release Consequence Analysis for a Hypothetical Geologic Radioactive Waste Repository in Salt.
Aug 79, 180p
U.S. Sales Only.

One subtask conducted under the INFCE program is to evaluate and compare the health and safety impacts of different fuel cycles in which all radioactive wastes (except those from mining and milling) are placed in a geologic repository in salt. To achieve this objective, INFCE Working Group 7 examined the radiologic dose to humans from geologic repositories containing waste arisings as defined for seven reference fuel cycles. This report examines the release consequences for a generic waste repository in bedded salt. The top of the salt formation and the top of the repository are assumed to be 250 and 600 m, respectively, below the surface. The hydrogeologic structure above the salt consists of two aquifers and two aquitards. The aquifers connect to a river 6.2 km from the repository. The regional gradient to the river is 1 m/km in all aquifers. Hydrologic, transport, and dose models were used to model two release scenarios for each fuel cycle, one without a major disturbance and one in which a major geologic perturbation breached the repository immediately after it was sealed. The purpose of the modeling was to predict the rate of transport of radioactive contaminants from the repository through the geosphere to the biosphere, and to determine the potential dose to humans. Of the many radionuclides in the waste, only exp 129 I and exp 226 Ra arrived at the river in sufficient concentrations for a measurable dose calculation. Radionuclide concentrations in the ground water pose no threat to man because the ground water is a concentrated brine and it is diluted by a factor of 10 exp 6 to 10 exp 7 upon entering the river. (Atomindex citation 11:529024)

INFCE/DEP/WG-7/22 PC **A02**/MF **A01**
INFCE (Belgium).
Impact Factors on Radioactive Waste Management. Legal and Institutional Matters.
P. Dejonghe. Mar 79, 17p
U.S. Sales Only.

This paper deals with clear definitions of the responsibilities of all parties involved on short and long-term, adequate financial assurance and some international standards with regard to the specifications on conditioning, storage and disposal. Furthermore, a light is thrown on the specific institutional problems in radioactive waste management, that might arise from the application of the various fuel cycles considered in the INFCE Study. (Atomindex citation 11:529085)

INFCE/DEP/WG-7/23 PC **A02**/MF **A01**
INFCE Working Group 7. Secretariat.
Brief Account of the Proceedings of Working Group 7, Waste Management and Disposal, of the International Nuclear Fuel Cycle Evaluation.
6p
U.S. Sales Only.

No abstract available.

INFCE/DEP/WG-7/3 PC **A02**/MF **A01**
INFCE (USA).
Waste Arisings from a High-Temperature Reactor with a Uranium-Thorium Fuel Cycle.
Sep 79, 8p
U.S. Sales Only.

This paper presents an equilibrium-recycle condition flow sheet for a high-temperature gas-cooled reactor (HTR) fuel cycle which uses thorium and high-enriched uranium (93% U-235) as makeup fuel. INFCE Working Group 7 defined percentage losses to various waste streams are used to adjust the heavy-element mass flows per gigawatt-year of electricity generated. Thorium and bred U-233 are recycled following Thorex reprocessing. Fissile U-235 is recycled one time following Purex reprocessing and then is discarded to waste. Plutonium and other transuranics are discarded to waste. Included are estimates of volume, radioactivity, and heavy-element content of wastes arising from HTR fuel element fabrication; HTR operation, maintenance, and decommissioning; and reprocessing

spent fuel where the waste is unique to the HTR fuel cycle. (Atomindex citation 11:528962)

INFCE/DEP/WG-7/4 PC **A03**/MF **A01**
INFCE (USA).
Long-Term Disposal of Enrichment Plant Tails.
Aug 79, 31p
U.S. Sales Only.

Approximately 97% of the uranium fed to the isotope separation plants is recovered as tails containing nominally 0.2 wt percent U-235. Essentially all this tails material produced in the past, as well as that currently being generated, is stored as solidified UF sub 6 in steel cylinders. This report describes a stand-alone, 10 tU/day facility for converting the UF sub 6 to a stable uranium oxide powder amenable to long-term storage in steel drums. The conversion is accomplished in a two-step process in which the UF sub 6 is first reduced to UF sub 4 with hydrogen in a tower reactor and then the UF sub 4 is pyrohydrolyzed to UO sub 2 with steam in a three-stage screw reactor. One reduction reactor supplies the feed for three pyrohydrolysis reactor lines. Included in the process flow sheets and reactor design details are descriptions of the major auxiliary components for vaporizing and feeding the UF sub 6 , a dissociator for ammonia used as a hydrogen source, a system for recovering anhydrous hydrogen fluoride, and a reactor system for the disposal of hydrous hydrogen fluoride. Two of the nominal 10 tU/day plants would be required to handle the tails produced in isotope separation plants supplying enriched uranium to a nuclear power industry with a generation capacity of 50 GWe per year. (Atomindex citation 11:528978)

INFCE/DEP/WG-7/7 PC **A02**/MF **A01**
INFCE (France).
Solidification of High-Level Wastes from Reprocessing.
8p
U.S. Sales Only.

For the solidification of high-level activity liquid wastes, glass has been selected as the best material because of the combination of chemical, radiation and thermal stability. Properties of glass as a barrier are given. The industrial application of the process in the AVM plant at Marcoule (France) is described. (Atomindex citation 11:528979)

Juel-1567 PC **A06**/MF **A01**
Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Chemische Technologie.
Alternatives to Reduce exp 14 C Emissions in the Reprocessing of HTR Fuel Elements.
Diss,
P. C. Schmidt. Jan 79, 108p
In German.
U.S. Sales Only.

The interest of the public and of experts has increasingly focused on the formation of exp 14 C in nuclear reactors and its release from reactors and reprocessing plants. The paper attempts an experimental check of the validity of theoretical estimations concerning exp 14 C production rates. In particular, the applicability of the exp 14 C analysis in irradiated LWR pellets is checked and transferred to HTR fuel concepts. Statements on the exp 14 C content in matrix graphite, coating, and fuel make it possible to determine those process steps in which exp 14 C release is highest. Possibilities to reduce exp 14 C emissions by improved fuel element production technologies and by mechanical separation of graphite before combustion are theoretically estimated. (Atomindex citation 11:518153)

JAERI-M-8240 PC **A05**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Separation Methods Used for Large-Scale Production of Transplutonium Elements. Literature Survey of the Chemical Processes of Partitioning Transplutonium Elements in the High-Level Liquid Wastes of Fuel Reprocessing, (1).
S. Tachimori. May 79, 88p
In Japanese.
U.S. Sales Only.

The production of transplutonium elements by fission reactor in countries of the world is by combination of reactor technology and chemical engineering. A review is made of the chemical processes for production of transplutonium elements on a large scale from neutron-irradiated actinoids; first, historical progress of the production in macro quantities of transplutonium elements in the world, and then the principal processes developed in respective countries and organizations. Finally, these methods are discussed with emphasis placed on the possibility of application to the partitioning of high-level liquid wastes in fuel reprocessing. (Atomindex citation 11:517786)

JAERI-M-8339 PC **A05**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Recovery of Actinoids from Waste Solutions of Fuel Reprocessing. Literature Survey of the Chemical Processes of Partitioning Transplutonium Elements in the High-Level Liquid Wastes of Fuel Reprocessing, 2.
S. Tachimori. Jul 79, 89p
In Japanese.
U.S. Sales Only.

In part II of the literature survey, characteristics of the principal separation methods, i.e., solvent extraction and ion exchange, for plutonium(IV), americium(III) and lanthanoids(III) are first described to help understand essentials in the actual examples of applications of the methods. Then, some examples of recovering actinoids from liquid wastes, especially on a large scale, are presented. Finally, flowsheets being developed in the world for partitioning high-level liquid wastes in fuel reprocessing are given with discussion on their respective problems. (Atomindex citation 11:525638)

NUREG/CR-1683 PC **A09**/MF **A01**
Harding-Lawson Associates, Oak Brook, IL.
Characterization of Existing Surface Conditions at Sheffield Low-Level Waste Disposal Facility.
Final rept.,
G. E. Heim, and M. V. Machalinski. Aug 80, 179p
HLA-9906-001-14
Contract NRC-02-80-057

The report presents results of the investigation to characterize the existing surface conditions at the Sheffield Low-Level Waste Disposal Facility, Sheffield, Illinois. The investigation is based on visual observations made in the field and detailed topographic surveying. The following information is presented: (1) Analyses of individual trench caps describing surface conditions and the ability of trench caps to minimize erosion and water infiltration into trenches; (2) A detailed survey of erosion at the site and a detailed description of the vegetation; and (3) A topographic survey. Numerous photographs are provided to document observations. Possible remedial actions, conclusion and recommendations for improving surface conditions are presented.

ONWI-91 PC **A03**/MF **A01**
Battelle Project Management Div., Columbus, OH. Office of Nuclear Waste Isolation.
Potential US/Canadian Cooperative Activities in Geological Disposal of Radioactive Waste.
J. O. Duguid. Mar 80, 43p TR-104
Contract AC06-76RL01830

A joint review meeting between the US and Canada was held on June 19 and 20, 1979 to discuss waste isolation activities in crystalline rocks. The review meeting served the purposes of an initial information transfer and as a mechanism to stimulate thinking for a workshop on US/Canadian cooperative programs which was held on June 21, 1979. The workshop participants divided into working groups to discuss areas of potential cooperation: the Administrative Working Group established protocol for information exchange and cooperative activities; the Geotechnical Working Group selected activities in exploration, field testing, instrumentation and measurement technique development, monitoring, and quality assurance where cooperation would be of benefit to both countries; and the Assessment/Modeling Working Group discussed areas in model development and verification, engineered barriers, radiation effects, hydrologic properties of fractured rocks, waste form leaching, and sorption where cooperation would enhance both the US and Canadian programs. (ERA citation 05:034605)

ORNL/TM-6987 PC **A07**/MF **A01**
Los Alamos Technical Associates, Inc., NM.
Actinide Partitioning-Transmutation Program Final Report. VII. Long-Term Risk Analysis of the Geologic Repository.
S. E. Logan, R. L. Conarty, H. S. Ng, L. J. Rahal, and C. G. Shirley. Sep 80, 130p
Contract W-7405-ENG-26

This report supports the overall assessment by Oak Ridge National Laboratory of actinide partitioning and transmutation by providing an analysis of the long-term risks associated with the terminal storage of wastes from a fuel cycle which incorporates partitioning and transmutation (P-T) and wastes from a cycle which does not. The system model and associated computer code, called AMRAW (Assessment Method for Radioactive Waste), are used for the analysis and are applied to the Los Medanos area in southeastern New Mexico. Because a conservative approach is used throughout, calculated results are believed to be consistently higher than reasonable expectations from actual disruptive incidents at the site and therefore are not directly suited for comparison with other analyses of the particular geologic location. The assessment is made with (1) the probabilistic, or risk, mode that uses combinations of reasonable possible release incidents with their probability of occurrence distributed and applied throughout the assessment period, and (2) the consequence mode that forces discrete release events to occur at specific times. An assessment period of 1 million years is used. The principal results are: (1) In all but the expulsive modes, exp 99 Tc and exp 129 I completely dominate cumulative effects based on their transport to man through leaching and movement with groundwater, effecting about 33,000 health effects (deaths) over the 1 million years; (2) P-T has only limited effectiveness in reducing long-term risk from a radionuclide waste repository under the conditions studied, and such effectiveness is essentially confined to the extremely unlikely (probability of occurrence 10 exp -12 /year) expulsive events; (3) Removal or immobilization of exp 99 Tc and exp 129 I might provide benefits sufficiently tangible to warrant special consideration. (ERA citation 05:036137)

ORNL/TM-7385/V2 PC **A18**/MF **A01**
Oak Ridge National Lab., TN.
Radioactive Waste Management Integrated Data Base: A Bibliography.
C. A. Johnson, and P. A. Garland. Sep 80, 409p
Contract W-7405-ENG-26

No abstract available.

ORNL/TM-7427 PC **A08**/MF **A01**
Oak Ridge National Lab., TN.
State-of-the-Art Report on Low-Level Radioactive Waste Treatment.
A. H. Kibbey, and H. W. Godbee. Sep 80, 155p
Contract W-7405-ENG-26

An attempt is made to identify the main sources of low-level radioactive wastes that are generated in the United States. To place the waste problem in perspective, rough estimates are given of the annual amounts of each generic type of waste that is generated. Most of the wet solid wastes arise from the cleanup of gaseous and liquid radioactive streams prior to discharge or recycle. The treatment of the process streams and the secondary wet solid wastes thus generated is described for each type of government or fuel cycle installation. Similarly, the institutional wet wastes are also described. The dry wastes from all sources have similar physical and chemical characteristics in that they can be classified as compactible, noncompactible, combustible, noncombustible, or combinations thereof. The various treatment options for concentrated or solid wet wastes and for dry wastes are discussed. Among the dry-waste treatment methods are compaction, baling, and incineration, as well as chopping, cutting, and shredding. Organic materials can usually be incinerated or, in some cases, biodegraded. The filter sludges, spent resins, incinerator ashes, and concentrated liquids are usually solidified in cement, urea-formaldehyde, or unsaturated polyester resins prior to burial. Asphalt has not yet been used as a solidificaton agent in the United States, but it probably will be used in the near future. The treatment of radioactive medical and bioresearch wastes is de-

scribed, but the waste from radiochemical, pharmaceutical, and other industries is not well defined at the present time. Recovery of waste metals and treatment of hazardous contaminated wastes are discussed briefly. Some areas appearing to need more research, development, and demonstration are specifically pointed out. (ERA citation 05:034600)

ORNL/TM-7476 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
High-Level Waste Program Progress Report, April 1, 1980-June 30, 1980.
Aug 80, 26p
Contract W-7405-ENG-26

The highlights of this report are on: waste management analysis for nuclear fuel cycles; fixation of waste in concrete; study of ceramic and cermet waste forms; alternative high-level waste forms development; and high-level waste container development. (ERA citation 05:036106)

PB81-114910 MF **A01**
National Research Council, Washington, DC.
Implementation of Long-Term Environmental Radiation Standards: The Issue of Verification.
1979, 76p ISBN-0-309-02879-5
Contract EPA-68-01-3931
Library of Congress catalog card no. 79-87667.
Microfiche copy only.

In response to a request from the U.S. Environmental Protection Agency (EPA), the National Research Council, through a Panel of the Committee on Radioactive Waste Management, studied the problems of verifying the satisfactory implementation of (i.e., compliance with) environmental radiation standards for deep geologic repositories for high-level radioactive wastes. This report contains the major conclusions and recommendations of the study. The report begins with a summary of the Panel's major conclusions and recommendations. Important background information on radioactive wastes--their origin, the amounts presently in existence, and possible permanent disposal of the wastes in deep geologic formations--is discussed in Chapter 1. The potential risks posed by these wastes is described in Chapter 2. The long-term environmental radiation standards that EPA is required to establish, and the feasibility and means of assuring compliance with such standards are examined in Chapter 3. The information that is required for purposes of assuring long-term compliance is described in Chapter 4, and the status and limitations of current knowledge are examined in Chapter 5.

PRAV-1.32 PC **A02**/MF **A01**
Programraadet foer Radioaktivt Avfall, Stockholm (Sweden).
Combustion of Ion-Exchange Materials in Fluidized Bed. Final Report.
I. Bjerle, and O. Svensson. Sep 79, 24p
In Swedish.
U.S. Sales Only.

Volume reduction of ion exchange material by combustion in fluidized beds at low temperatures is seriously hampered by the production of inflammable gases, which are combusted uncontrollably above the bed. The addition of platinum catalysts inhibits the gasproduction and confines the combustion to the bed, but increases the production of coke, which means that the volume reduction is less efficient. (Atomindex citation 11:514537)

PRAV-3-19 PC **A02**/MF **A01**
Programraadet foer Radioaktivt Avfall, Stockholm (Sweden).
System for the Transfer of Long-Lived Radioactive Nuclides from Spent Organic Ion-Exchange Resins from Nuclear Power Stations to Zeolites -Titanates.
R. Arnek, and S. Forberg. Oct 79, 21p
U.S. Sales Only.

In order to immobilise radioactive wastes bound in organic ion exchange resin more safely and compactly a simple method for transferring them to zeolites and titanates has been developed. The study has been concentrated on Cs-137, Sr-90 and Co-60. These were eluted from the resins by solutions of sodium citrate or tartarate with an effectiveness of well over 99.9 percent, for Cs-137 and Sr-90 and 97-98 percent for Co-60. Sorption in zeolite and titanate appears to be more effective than elution, and a ten-fold volume reduction from the spent resins to the final sintered products seems to be a reasonable expectation. (Atomindex citation 11:528967)

PTB-SE-1 PC **A04**/MF **A01**
Physikalisch-Technische Bundesanstalt, Brunswick (Germany, F.R.). Abt. Sicherstellung und Endlagerung Radioaktiver Abfaelle.
Seminar on R + D Work and Studies on the Disposal and Final Storage of Radioactive Waste. Report SE-1.
Oct 79, 60p
In German.
U.S. Sales Only.

The Seminar had following goals: The research- and development works for safeguarding and final storage of waste are discussed and gone through with regard to their complete processing in due time. A survey on possible co-operation in R+D work is to be set up. The PTB (Physical-technical federal organisation) can normally not order any R+D work nor can it financially support them; it will, however support necessary R+D works with all possibilities it has, for example by sending letters of recommendation and agreement to ministries and other competent institutions. For special investigations relevant for the permission, there are also own means in restricted volume available. (Atomindex citation 11:529042)

PTB-SE-2 PC **A02**/MF **A01**
Physikalisch-Technische Bundesanstalt, Brunswick (Germany, F.R.). Abt. Sicherstellung und Endlagerung Radioaktiver Abfaelle.
Protocol of the Results of the 18TH PTB Seminar 'Site-Independent Planning of the Final Storage Facility at the Site of the Gorleben Integrated Nuclear Waste Management Centre.
Nov 79, 15p
In German.
U.S. Sales Only.

On 24 April 1979 the Seminar on site-independent planning of the final storage mine at the site of the integrated waste management centre Gorleben under the leadership of H. Roethemeyer took place in PTB, Braunschweig. The Seminar was attended by PTB-staff and by 45 invited attendees from several federal ministries and their consulting committees and from industry, authorities, universities, and research institutes. In several presentations, PTB and the industry reported on the situation of the planning works. The new task to set up the systems of the Federal Government for safeguarding and final storage of radioactive waste and to operate them was given PTB with the 4th supplementary atomic law of 31st October 1976. Furthermore PTB has to take care of the R-D works necessary to realise these systems to be finished in due time. This point was also reported in several presentations on the present situation of the works concerned. Numerous contributions made in the discussions following to the prescutations brought valuous ideas for the progress of the plannings and the R-D programmes. (Atomindex citation 11:529043)

RHO-CD-980 PC **A03**/MF **A01**
Atomics International Div., Richland, WA. Rockwell Hanford Operations.
Waste Tank Core Drilling Demonstration Results.
C. DeFigh-Price. May 80, 38p
Contract AC06-77RL01030

In order to develop a strong data base and methodology for evaluating the structural integrity of the existing waste storage tanks, it is desirable to obtain concrete core samples from load bearing areas (the haunch, wall and footing) of actual waste tanks. The cores can be tested and compared with laboratory test data. Before cores are removed from the load bearing areas of an actual waste tank, it must be demonstrated that the drilling operation, including water control, can be safely performed. Two drilling tests were successfully completed in the 100-F Area during February and March 1980 demonstrating the feasibility of core drilling the wall of a 1 million gallon underground waste tank. This report summarizes the results of the demonstrations. (ERA citation 05:034607)

SAND-80-0467 PC **A03**/MF **A01**
Sandia Labs., Albuquerque, NM.
Numerical Simulation of Creep Closure of Deep Potash Mines (With Application to Waste Isolation).
D. E. Munson, and P. R. Dawson. Jul 80, 28p
Contract AC04-76DP00789

In this work, numerical simulation of the mechanical response of a deep mine opening in potash is shown to match measured room closures to within a factor of two. In this case, the calculated closure rates after eight years are within 25 to 75 percent of those measured. In making the calculations, a constitutive model for creep, as determined from laboratory triaxial tests of salt and short cylinder compressive tests of potash, was incorporated into a coupled thermal-mechanical fluid flow code, COUPLEFLO. The model is a multimechanism formulation of thermally activated processes acting in parallel. Because the field tests were well-documented, two-dimensional configurations and because the constitutive model was uniquely determined by laboratory data, the agreement between calculations and field data for these significant time durations is a first step in verification of the simulation technique. Application of the model and numerical methods presented here can be used to understand deformation in deep potash mines and, very importantly, to aid also in design of the waste isolation and petroleum storage facilities. (ERA citation 05:034608)

UCID-18796-80-1 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Waste Isolation Program Evaluation Assistance. Quarterly Technical Progress Report.
R. C. Maninger, and T. F. Harvey. 25 Sep 80, 20p
Contract W-7405-ENG-48

This report covers the effort for the first quarter on the Waste Isolation Program Evaluation Assistance Project at LLNL. The basic principles of a method of portraying the National Waste Terminal Storage Program are outlined and an example of their applcations is given. (ERA citation 05:036145)

UCRL-81147(Pt.2)(Rev.1) PC **A02**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Leaching Characteristics of Actinides from Simulated Reactor Waste.
H. C. Weed, D. G. Coles, D. J. Bradley, R. W. Mensing, and J. S. Schweiger. 1979, 9p CONF-791112-69(Pt.2)(Rev.1)
Contract W-7405-ENG-48
Symposium on the scientific basis for nuclear waste management, Boston, MA, USA, 26 Nov 1979.

Leach rates for exp 237 Np and exp 239 Pu are investigated with a single-pass leaching system. The factorial experimental design uses several combinations of solution composition and flow rate; and two temperatures, 25 exp 0 and 75 exp 0 C. The 25 exp 0 C results are compared with those form a modified IAEA procedure. At 25 exp 0 C, leach rates decrease with time. Agreement between results from the single-pass and modified IAEA methods is fair with WIPP brine leachant, good with NaHCO sub 3 , and good with distilled H sub 2 O. Leach rates are approximately independent of flow rates at room temperature, but increase with flow rates at high temperature. Rates for exp 237 Np increase with temperature, but those fro exp 239 Pu either decrease or do not change with temperature. (ERA citation 05:036146)

UCRL-84918 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Nuclear Waste Management: Storage and Disposal Aspects.
B. D. Patterson, S. A. Dave, and W. J. O'Connell. 1980, 15p CONF-800904-2
Contract W-7405-ENG-48
American Society of Civil Engineers specialty conference: civil engineering and nuclear power, Knoxville, TN, USA, 15 Sep 1980.

Long-term disposal of nuclear wastes must resolve difficulties arising chiefly from the potential for contamination of the environment and the risk of misuse. Alternatives available for storage and disposal of wastes are examined in this overview paper. Guidelines and criteria which may govern in the development of methods of disposal are discussed. (ERA citation 05:034610)

18H. Radioactivity

CONF-800334-22 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Residual Radioactivity in the Vicinity of Formerly Utilized MED/AEC Sites.
F. F. Haywood, and W. A. Goldsmith. 1980, 14p
Contract W-7405-ENG-26
DOE environmental control symposium, Reston, VA, USA, 17 Mar 1980.

As demand for uranium and thorium was accelerated during the 1940's, services of chemical and metallurgical firms and major research facilities were contracted as needed by the Manhattan Engineer District (MED). A lack of documentation of the radiological status at the time contracts were terminated at these facilities led the Department of Energy (DOE), and its predecessor the Energy Research and Development Administration (ERDA), to develop a major radiological resurvey program to fill this information void. A combination of aerial and ground-level radiological monitoring teams were utilized to identify and assess off-site radioactivity. Results from comprehensive aerial surveys provide the approximate areal extent of elevated radiation levels on the ground. These aerial survey results led to two types of ground-level surveys: (1) gamma-ray scanning on foot or from a motorized vehicle (mobile lab based system) to pinpoint the location of residual radioactivity; and (2) compehensive radiological surveys to determine the amount and type of materials present on specific parcels of private and public property identified during the scanning. This type of investigation was initiated in 1978 and has been successful in identifying and assessing the potential radiation hazard from property on which materials bearing natural radioactivity have been found. This paper contains a description of the techniques used to find and evaluate radioactive material displaced outside the boundaries of a formerly utilized site. (ERA citation 05:035450)

DOE/EV/13573-T1 PC **A09**/MF **A01**
Yale Univ., New Haven, CT.
Natural Radioactive Isotopes of Beryllium in the Environment.
1979, 178p
Contract AS02-76EV13573

Each of the papers was abstracted individually for ERA/EDB/INIS. (ERA citation 05:035465)

EML-373 PC **A07**/MF **A01**
Department of Energy, New York. Environmental Measurements Lab.
Measured Hourly and Daily Average exp 85 Kr Concentrations within 10 Km of the Savannah River Plant.
C. V. Gogolak, H. L. Beck, and M. M. Pendergast. Aug 80, 130p

Mean hourly ground-level exp 85 Kr concentrations measured at six locations within 10 km of the Savannah River Plant chemical separations facilities during calendar year 1976 are presented in tabular form along with the mean daily concentrations for each site. These data, obtained with arrays of thin window G-M counters especially designed for this purpose, can be used to test point source atmospheric dispersion models. (ERA citation 05:035436)

NVO-225 PC **A18**/MF **A01**
Department of Energy, Las Vegas, NV. Nevada Operations Office.
Tatum Dome Project, Lamar County, Mississippi.
P. R. Fenske, and T. M. Humphrey, Jr. Aug 80, 413p

The Tatum Dome site, near Hattiesburg, Mississippi, has been host to two nuclear detonations and two nonnuclear gas detonations. The top of the cavity formed by the detonations was 2660 feet below land surface and 1160 feet below the top of the salt dome. All detonations were totally contained within the salt dome in which they were fired. Activities at the site occurred between 1964 ad 1970. In 1978, NV was asked to provide proof that radiological contamination was not adversely affecting water quality in the aquifers over Tatum Dome. All except the Surficial Aquifer, which was known to be contaminated by tritium, were extensively tested to obtain hydrological data. Sufficient samples were taken to determine if contamination existed in the aquifer around the emplacement casing at surface ground zero (SGZ). Low tritium concentrations were found in the Local Aquifer, approximately 150 to 200 feet below land surface, during this project, but no radioactivity was found in any of the other aquifers above Tatum Dome. The Local Aquifer is the next aquifer below the Surficial Aquifer. (ERA citation 05:037166)

PNL-3127 PC **A08**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Radiological Survey of Exposed Shorelines and Islands of the Columbia River Between Vernita and the Snake River Confluence.
M. J. Sula. Apr 80, 163p
Contract AC06-76RL01830

This document describes a radiological survey which was performed to evaluate the magnitude and distribution of radioactive contamination on the exposed shorelines of the Columbia River along and downstream of the Hanford Site. The area encompassed by the survey includes the lowlying exposed land on both sides of the river from the uppermost point of production reactor discharge into the river at 100-B Area to the confluence of the Snake and Columbia Rivers, almost 60 miles downstream of the starting point. External exposure rate measurements were made at nearly 30,000 locations during the survey - accounting for approximately 60% of the land in the study area. Measurable radioactive contamination, resulting from past Hanford operations was found to be present on the shorelines of the Columbia River along the study area. The absence of short-lived radionuclides in the shore sediments and the presence of contamination several meters above recent maximum river levels indicate that the material was deposited some years ago. (ERA citation 05:035471)

PNL-3497 PC **A03**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Environmental Radiation Safety: Source Term Modification by Soil Aerosols. Interim Report.
O. R. Moss, M. D. Allen, E. J. Rossignol, and W. C. Cannon. Aug 80, 48p
Contract AC06-76RL01830

The goal of this project is to provide information useful in estimating hazards related to the use of a pure refractory oxide of exp 238 Pu as a power source in some of the space vehicles to be launched during the next few years. Although the sources are designed and built to withstand reentry into the earth's atmosphere, and to impact with the earth's surface without releasing any plutonium, the possibility that such an event might produce aerosols composed of soil and exp 238 PuO sub 2 cannot be absolutely excluded. This report presents the results of our most recent efforts to measure the degree to which the plutonium aerosol source term might be modified in a terrestrial environment. The five experiments described represent our best effort to use the original experimental design to study the change in the size distribution and concentration of a exp 238 PuO sub 2 aerosol due to coagulation with an aerosol of clay or sandy loam soil. (ERA citation 05:037167)

PNL-3498 PC **A03**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Potential Airborne Release from Soil-Working Operations in a Contaminated Area.
S. L. Sutter. Aug 80, 30p
Contract AC06-76RL01830

Experiments were performed to provide an indication of how much material could be made airborne during soil-working operations in a contaminated area. Approximately 50 kg of contaminated soil were collected, dried, and mixed, and particle size distribution and exp 137 Cs content were characterized. In four experiments performed in a 2 ft x 2 ft wind tunnel at the Radioactive Aerosol Release Test Facility, soil was pumped into an airstream moving at 3.2, 10.4, 15.2, and 20 mph. These experiments were designed to maximize airborne releases by fluidizing the soil as it was pumped into the wind tunnel. Thus the airborne releases should represent upper limit values for soil-working operations. Airborne concentration and particle size samples were collected and all of the material deposited downstream was collected to calculate a mass balance. The fraction airborne was calculated using these measurements. (ERA citation 05:035447)

18I. Reactor Engineering and Operation

AECL-5814 PC **A07**/MF **A01**
Atomic Energy of Canada Ltd., Pinawa (Manitoba). Whiteshell Nuclear Research Establishment.
FISS: A Computer Program for Reactor Systems Studies.
H. Tamm, G. R. Sherman, J. H. Wright, and R. E. Nieman. Aug 79, 128p
U.S. Sales Only.

sigma FISS sigma is a computer code for use in investigating alternative fuel cycle strategies for Canadian and world nuclear programs. The code performs a system simulation accounting for dynamic effects of growing nuclear systems. Facilities in the model include storage for irradiated fuel, mines, plants for enrichment, fuel fabrication, fuel reprocessing and heavy water, and reactors. FISS is particularly useful for comparing various reactor strategies and studying sensitivities of resource consumption, capital investment and energy costs with changes in fuel cycle parameters, reactor parameters and financial variables. (author). (Atomindex citation 11:523412)

BMFT-FB-K-79-20 PC **A03**/MF **A01**
Bundesministerium fuer Forschung und Technologie, Bonn-Bad Godesborg (Germany, F.R.).
Experimental Investigations on a High Power Steam Generator; Determination of the Operation Behaviour of the Secondary Side.
H. Scheidl. 1979, 35p
In German.
U.S. Sales Only.

During commissioning of the 1200 MW-nuclear power plant measurements have been performed on the steam generator YB 04 for a more precise determination of the flow conditions and operating conditions. This steam generator is equipped with an additional instrumentation which makes it possible to determine the differential pressures in the steam generator, velocity of flow and temperature distribution in the fall space of the steam generator. In addition the signals of the operation instrumentation were registered. The measurements have been performed during different load increments and altered water levels. (Atomindex citation 11:518133)

CEA-CONF-4548 PC **A03**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Dept. des Etudes Mecaniques et Thermiques.
High Temperature Reactors.
J. Brisbois, and J. Rastoin. 1979, 29p
In French.
U.S. Sales Only.

With the abandonment of the development of steam cycle reactors which, in fact, represent the technology available now, the introduction of high temperature power generating reactors is now put back in the medium or long term with respect to two applications specific to this type of reactor, namely generating electricity by helium turbine and coal gasification. A first question arises, incidentally in the same terms as previously; will high temperature power generating reactors have enough advantages to be introduced on the market in com-

petition with the systems already in place (PWR, BWR, heavy water reactors) or being developed (FBR). The second question is to know when coal gasification reactor will be introduced on a commercial basis. Technically speaking, providing the target is not too ambitious, a protopype could see the light of day at the start of the 90s, thereby leading to a commercial introduction around the year 2000. This target means that the nations concerned should start a close cooperation in coal gasification and in nuclear technology at one and the same time. The easiest way, it would seem, is to concentrate the effort on the production of hydrogen by methane reforming which is the common trunk of several uses on the one end, and has the least amount of technological difficulty on the other. At least, this is the current prevailing position in France which will be discussed shortly with Germany. (Atomindex citation 11:514344)

CONF-800804-22 PC **A03**/MF **A01**
Foster Wheeler Corp., Livingston, NJ.
Applications of One-Dimensional Models in Simplified Inelastic Analyses.
S. A. Kamal, J. M. Chern, and D. H. Pai. 1980, 39p
Contract W-7405-ENG-26
ASME century 2 emerging technology conference, San Francisco, CA, USA, 10 Aug 1980.

This paper presents an approximate inelastic analysis based on geometric simplification with emphasis on its applicability, modeling, and the method of defining the loading conditions. Two problems are investigated: a one-dimensional axisymmetric model of generalized plane strain thick-walled cylinder is applied to the primary sodium inlet nozzle of the Clinch River Breeder Reactor Intermediate Heat Exchanger (CRBRP-IHX), and a finite cylindrical shell is used to simulate the branch shell forging (Y) junction. The results are then compared with the available detailed inelastic analyses under cyclic loading conditions in terms of creep and fatigue damages and inelastic ratchetting strains per the ASME Code Case N-47 requirements. In both problems, the one-dimensional simulation is able to trace the detailed stress-strain response. The quantitative comparison is good for the nozzle, but less satisfactory for the Y junction. Refinements are suggested to further improve the simulation. (ERA citation 05:036653)

CONF-801002-1 PC **A03**/MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Thermal-Hydraulics of the PFB/LOFT Lead Rod Loss-of-Coolant Experiments.
D. J. Varacalle, Jr., R. W. Garner, P. E. MacDonald, and W. R. Cox. 1980, 36p
Contract AC07-76ID01570
ANS/ASME topical meeting on reactor thermal-hydraulics, Saratoga, NY, USA, 9 Oct 1980.

Results of the four PBF/LOFT Lead Rod sequential blowdown tests conducted in the Power Burst Facility (PBF) are presented. The primary objective of the test series was to evaluate the extent of mechanical deformation that would be expected to occur to low pressure (0.1 MPa), light water reactor design fuel rods subjected to a series of nuclear blowdown tests, and to determine if subjecting deformed fuel rods to subsequent testing would result in rod failure. The extent of mechanical deformation (buckling, collapse, or waisting of the cladding) was evaluated by comparison of cladding temperature versus system pressure response with out-of-pile experimental data, and by posttest visual examinations and cladding diametral measurements. Tests LLR-3, LLR-5, LLR-4, and LLR-4A were performed at system conditions of 595 exp 0 K coolant inlet temperature, 15.5 MPa system pressure, and 41, 46, 57 and 56 kW/m test rod peak linear powers, respectively, at initiation of blowdown. Cladding temperatures during the tests ranged from 870 to 1260 exp 0 K. (ERA citation 05:034981)

CONF-801002-10 PC **A02**/MF **A01**
Idaho National Engineering Lab., Idaho Falls.
RELAPS Choked Flow Model and Application to a Large Scale Flow Test.
V. H. Ransom, and J. A. Trapp. 1980, 21p
Contract AC07-76ID01570
ANS/ASME topical meeting on reactor thermal-hydraulics, Saratoga, NY, USA, 9 Oct 1980.

The RELAP5 code was used to simulate a large scale choked flow test. The fluid system used in the test was modeled in RELAP5 using a uniform, but coarse, nodalization. The choked mass discharge rate was calculated using the RELAP5 choked flow model. The calulations were in good agreement with the test data, and the flow was calculated to be near thermal equilibrium. (ERA citation 05:036684)

CONF-801002-2 PC **A02**/MF **A01**
Idaho National Engineering Lab., Idaho Falls.
Application of RELAP5 to a Pipe Blowdown Experiment.
K. E. Carlson, V. H. Ransom, and R. J. Wagner. 1980, 15p
Contract AC07-76ID01570
ANS/ASME topical meeting on reactor thermal-hydraulics, Saratoga, NY, USA, 9 Oct 1980.

The application of the RELAP5 computer program to a pipe blowdown experiment is described in this paper. The basic hydrodynamic model, constitutive relations, and special process models included in RELAP5 are also briefly discussed. The results of this application confirm the effectiveness of using a choked flow model. (ERA citation 05:034982)

CONF-801002-7 PC **A02**/MF **A01**
EG and G Idaho, Inc., Idaho Falls.
SUPERH-SG, A Computer Model Describing Nonequilibrium, Two Phase Flow in a Light Water Reactor Steam Generator During Reflood.
G. E. Wilson, D. M. Ogden, and G. E. McCreery. 1980, 17p
Contract AC07-76ID01570
ANS/ASME topical meeting on reactor thermal-hydraulics, Saratoga, NY, USA, 9 Oct 1980.

An existing computer model for emergency core cooling reflood heat transfer has been modified to describe the nonequilibrium, two-phase, thermal-hydraulic pheonomena in a double-pass steam generator of a light water reactor during reflood. The predictive quality of the model has been assessed by comparison of calculated results with temperature, quality, and heat transfer data from an experiment which simulated the thermal-hydraulic performance of a pressurized water reactor steam generator. The calculated temperatures and qualities are generally within the experimental data uncertainty for a wide range of test conditions. Calculated heat transfer is less well calculated, but adequate for many purposes. (ERA citation 05:036683)

DLCS-5000280 PC **A03**/MF **A01**
Duquesne Light Co., Shippingport, PA.
(Shippingport Atomic Power Station). Quarterly Operating Report, Second Quarter 1980.
1980, 26p
Contract AC11-76PN00292

At the beginning of the second quarter of 1980, the Shippingport Atomic Power Station remained shutdown for the normally planned semiannual maintenance and testing program, initiated February 29, 1980. The station was in a cooldown condition at approximately 150 exp 0 F and 300 psig with a steam bubble maintained in the pressurizer and the reactor coolant pumps in slow speed. The station remained in a cooled down condition until April 8, when a plant heat-up was initiated and completed on April 11, from which time normal operating parameters were maintained. The reactor was operated at low power levels as required for cold and hot planned testing. Base mode operations began on April 19. Swingload operations began May 20 and occurred daily through May 29 with levels ranging down to 30% to 60% power. On May 30, the station underwent a planned shutdown to perform test procedure LWBR-DLCS 64601, Bank Reactivity Worth and Temperature and Power Coefficients of Reactivity at Power. On May 31, criticality was achieved and the station returned to full power. Swingload operations resumed on June 1 and continued daily through the end of the quarter with the exceptions of June 17 and June 30. Swingload levels ranged down to 27.5% to 60% power. (ERA citation 05:036650)

DOE/ET/37205-T2 PC **A06**/MF **A01**
Brigham Young Univ., Provo, UT. Dept. of Chemical Engineering.
Chemical Simulation Modeling of Heat Transfer in LMFBRs.
D. V. Wiberg. Apr 80, 123p
Contract AS02-76ET37205
Thesis.

A chemical reaction conducted in a wax cylinder was used in this study to simulate a CDA occurring in a reactor. The exothermic reaction of dimethyl sulfoxide (DMSO) with acetyl chloride (AC) was used as the chemical reaction to simulate the internally heated liquid pool. SUN-3420 wax was used to construct the cylindrical reaction vessel to simulate cladding and containment. During a CDA, a question remains as to whether the containment would be miscible in the molten fuel. To allow for the possibility that either may be true, two cases were evaluated in this study. By using acetone as the solvent in the DMSO and AC solutions, the case in which the vessel was relatively insoluble in the reaction mixture was simulated. By using benzene as the solvent in the DMSO and AC solution, the case in which the molten vessel was more soluble in the reaction mixture was simulated. Based on the findings of this work the proposed heat transfer correlations for volumetrically heated liquid pools may be used with greater confidence as to their accuracy and applicability. (ERA citation 05:036688)

GA-A-15314 PC **A03**/MF **A01**
General Atomic Co., San Diego, CA.
Licensing Topical Report: Application of Probabilistic Risk Assessment in the Selection of Design Basis Accidents.
W. J. Houghton. Jun 80, 50p
Contract AT03-76ET35300

A probabilistic risk assessment (PRA) approach is proposed to be used to scrutinize selection of accident sequences. A technique is described in this Licensing Topical Report to identify candidates for Design Basis Accidents (DBAs) utilizing the risk assessment results. As a part of this technique, it is proposed that events with frequencies below a specified limit would not be candidates. The use of the methodology described is supplementary to the traditional, deterministic approach and may result, in some cases, in the selection of multiple failure sequences as DBAs; it may also provide a basis for not considering some traditionally postulated events as being DBAs. A process is then described for selecting a list of DBAs based on the candidates from PRA as supplementary to knowledge and judgments from past licensing practice. These DBAs would be the events considered in Chapter 15 of Safety Analysis Reports of high-temperature gas-cooled reactors. (ERA citation 05:034983)

GA-A-15799 PC **A02**/MF **A01**
General Atomic Co., San Diego, CA.
High-Pressure Test Loop Design and Application.
R. D. Burnette, J. N. Graves, P. G. Blair, and N. L. Baldwin. Jul 80, 23p
Contract AT03-76ET35300

A high-pressure test loop (HPTL) has been constructed for the purpose of performing a number of chemistry experiments at simulated HTGR conditions of temperature, pressure, flow, and impurity content. The HPTL can be used to develop, modify, and verify computer codes for a variety of chemical processes involving gas phase transport in the reactor. Processes such as graphite oxidation, fission product transport, fuel reactions, purification systems, and dust entrainment can be studied at high pressure, which would largely eliminate difficulties in correlating existing laboratory data and reactor conditions. (ERA citation 05:036651)

GA-A-15857 PC **A06**/MF **A01**
General Atomic Co., San Diego, CA.
GCFR Development Status Report.
May 80, 102p
Contract AT03-76SF71023

This report describes the major design features of the gas-cooled fast breeder reactor being developed in the United States principally at General Atomic Company. The report gives the general design strategy and highlights the design features of the reactor core and the nuclear steam supply components. It describes the design results on

plant safety and licensing. (ERA citation 05:036655)

GA-A-16033 PC **A02**/MF **A01**
General Atomic Co., San Diego, CA.
HTGR Safety Philosophy.
V. Joskimovic, and C. R. Fisher. Aug 80, 15p
CONF-800946-2
Contract AT03-76ET35300
IAEA specialists meeting on gas cooled reactor safety and licensing aspects, Lausanne, Switzerland, 1 Sep 1980.

The accident at the Three Mile Island has focused public attention on reactor safety. Many public figures advocate a safer method of generating nuclear electricity for the second nuclear era in the US. The paper discusses the safety philosophy of a concept deemed suitable for this second nuclear era. The HTGR, in the course of its evolution, included safety as a significant determinant in design philosophy. This is particularly evident in the design features which provide inherent safety. Inherent features cause releases from a wide spectrum of accident conditions to be low. Engineered features supplement inherent features. The significance of HTGR safety features is quantified and order-of-magnitude type of comparisons are made with alternative ways of generating electricity. (ERA citation 05:034986)

GKSS-79/E/29 PC **A03**/MF **A01**
Gesellschaft fuer Kernenergieverwertung in Schiffbau und Schiffahrt m.b.H., Geesthacht-Tesperhude (Germany, F.R.).
Time- and Power-Behaviour of Power- and Temperature Form Factors in Reactors of the FDR-Type.
R. Fiebig, and A. Krueger. 1979, 47p
In German.
U.S. Sales Only.

With a one-dimensional dynamics program KINE, a series of operation transients of a FDR-type reactor was recalculated in order to investigate how the form factors for neutron power and fuel temperature changed. It was shown that the form factors changed with the transient in positive or negative direction but not more than 3%. For the hypothetical accident with a considerable power increase (70%), there was only an increase of the formfactors by 10%. This lies within the usual safety margins. (Atomindex citation 11:518125)

GKSS-79/E/30 PC **A04**/MF **A01**
Gesellschaft fuer Kernenergieverwertung in Schiffbau und Schiffahrt m.b.H., Geesthacht-Tesperhude (Germany, F.R.).
KINE, A One-Dimensional Dynamics Program for PWR Reactors with Partial Boiling in the Core.
R. Fiebig, and A. Krueger. 1979, 55p
In German.
U.S. Sales Only.

KINE is a one-dimensional dynamics program for PWR reactors with partial boiling in the core. The time-dependent diffusion equation is resolved in 2 energy-groups and 6 groups of delayed neutrons by means of a backwards extrapolation method. Hereby the group constants are meshwise equations of the coolant density. As a particularity this programme deals with partial boiling in the core. Without a largescale thermohydraulic model the radial average coolant densities for all axial meshes are determined under the assumption of a parabola-shaped power profile. This way, the program becomes suitable, above all, for PWR reactors, e.g. reactors with self-pressurisation of the FDR-type. Very simple approximation formulas for group constants and some state equations of water contribute to an extremely fast program. (Atomindex citation 11:517989)

HEDL-SA-2198 PC **A02**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Dual Gaging 2200 exp 0 C Johnson Noise Power Thermometer.
C. P. Cannon. Jun 80, 17p
Contract AC14-76FF02170

A Johnson Noise Power Thermometer (JNPT) for temperature measurements to 2200 exp 0 C in reactor fuel rods has been fabricated and is being test evaluated for use in the Loss-of-Fluid-Test (LOFT) reactor safety tests. Temperature is determined by measuring the thermal noise spontaneously generated in a sensor coil. Thermoelement wires are used for connecting leads to the sensor coil and thereby provide for simultaneous temperature measurement as a thermocouple. Evaluation units have been fabricated from 1/16-inch diameter Re/W sheath material and HfO sub 2 insulators using a 0.010-inch diameter Re sensor coil and Re/W thermoelement wires. The thermocouple probe is sealed with an alumina ceramic-to-metal seal and a stainless steel sheathed compensating lead cable transmits the output signal to the measurement instrumentation. (ERA citation 05:036676)

IAE-3104 PC **A03**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Atomnoi Energii.
Basic Physical-Technical Characteristics of the WWER-Type Reactor Installations.
V. V. Semenov. 1979, 43p
In Russian.
U.S. Sales Only.

The main technical and neutron-physical characteristics of the WWER-210, WWER-365, WWER-440, WWER-1000 water-water energy reactors in Novo Voronezh and Kolskaya NPP are presented. Indices of the reactor installations are reduced into a table, similar, as to its form, to IAEA questioneers out of the collection "Directory of nuclear reactors. Power reactors. Vienna, IAEA." The material presented includes the following sections: general information; reactor physics; reactor core; fuel element; heat transfer in the reactor core; the reactor control, management and defence system; heat-carrier tract; reflector and defence; reactor vessel; reactor protective envelope; turbogenerator; economics. (Atomindex citation 11:514338)

JAERI-M-8285 PC **A02**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Effects of Run-out Power on the Fuel Behavior under RIA Conditions. Long Run-out Power Experiments at NSRR.
M. Ochiai, T. Inabe, T. Tanzawa, K. Ishijima, and S. Saito. Jun 79, 17p
In Japanese.
U.S. Sales Only.

The proportion of fuel enthalpy increase due to run-out power could be greater in RIA (Reactivity Initiated Accident) conditions postulated for a power reactor than in NSRR standard experimental conditions. In a series of NSRR experiment, two experiments were carried out to examine effects of the run-out power on behavior of a fuel rod. The two used NSRR standard test fuel rods with total energy depositions of 283 and 170 cal/g.UO sub 2 , respectively. The corresponding energy depositions due to run-out power were 39 and 30 cal/g.UO sub 2 . It was confirmed that the additional run-out power has no large influence on failure threshold and thermal behavior of the fuel rods. (Atomindex citation 11:518104)

JAERI-M-8287 PC **A04**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Open Data Tapes of ROSA-II Tests. Users' Manual on the Tapes.
M. Suzuki, H. Osaki, and S. Sekiguchi. Jun 79, 55p
In Japanese.
U.S. Sales Only.

Tests simulating a postulated loss-of-coolant accident and performance of ECCS in a PWR were carried out with the ROSA-II test facility. The test data were already published as data reports (No.1 -- 13 and 2 for UHI tests). For the purpose of general use of the ROSA-II test data, open data tapes recording the data are made available in the calculation center of JAERI. Following the procedures in the present manual, anyone who utilizes the calculation center can obtain the test data as figures and numerical tables. On the other hand, anyone who wishes to process the open data tapes with other computer system than that in the calculation center may apply to Reactor Safety Laboratory 1, JAERI, for reproduction of the tapes and can obtain the same after suitable conversion of the calculation program for that computer system. (Atomindex citation 11:518598)

JAERI-M-8293 PC **A06**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Reference Core Design of the Experimental Multi-Purpose, Very High Temperature Reactor. Mark-III Core Nuclear Characteristics.
M. Hirano, R. Shindo, T. Watanabe, O. Ishiguro, and N. Saito. Jun 79, 101p
In Japanese.
U.S. Sales Only.

Objective of the Mk-III core design are increase of Reynolds number, increase of shutdown margin, realization of excore instrumentation and adjustment to structural design, which have remained in Mk-II core design. The Mk-III core has satisfied the design criteria, though margins are not so large. Nuclear core design of the Mk-III and its nuclear characteristics are described in detail. Through the present study, design limits could be revealed of the VHTR core using pin-in-block type fuel elements of hollow fuel pins. (Atomindex citation 11:517991)

NIIAR-34(393) PC **A02**/MF **A01**
Nauchno-Issledovatel'skii Inst. Atomnykh Reaktorov, Dimitrovgrad (USSR).
Using the Methods of the Pattern Recognition Theory for Detection of Boiling in Fast Reactors.
V. V. Golushko, A. B. Muralev, T. Yu. Nedyak, and V. S. Dunaev. 1979, 12p
In Russian.
U.S. Sales Only.

Results of record processing of experiments on the boiling detection with usage of separate algorithms of the theory of pattern recognition theory are presented. Requirements to algorithms are determined by the conditions of recognition system operation. Parameters describing boiling process have been selected taking into account its peculiarities. Evaluation of parameters informativity has been carried out according to their dispersion and entropy. Two most informative parameters have been selected as a result which gives a possibility to built simple enough classifier: dividing straight lines. Possibility of boiling detection and identification with an aid of methods of the pattern recognition theory, which may be used at detector designing. (Atomindex citation 11:523508)

NUREG/CR-1559 PC **A12**/MF **A01**
Argonne National Lab., IL.
Transient Critical Heat Flux and Blowdown Heat-Transfer Studies,
Joseph C. Leung. Nov 80, 268p ANL-80-53

The objective of the study is to give a best-estimate prediction of transient critical heat flux (CHF) during reactor transients and hypothetical accidents. To accomplish this task, a predictional method has been developed. Basically it involves the thermal-hydraulic calculation of the heated core with boundary conditions supplied from experimental measurements. CHF predictions were based on the instantaneous 'local-conditions' hypothesis, and eight correlations (consisting of round-tube, rod-bundle, and transient correlations) were tested against most recent blowdown heat-transfer test data obtained in major U.S. facilities. The prediction results are summarized in a table in which both CISE and Biasi correlations are found to be capable of predicting the early CHF of about 1s.

NUREG/CR-1603 PC **A10**/MF **A01**
Lawrence Livermore National Lab., CA.
Evaluation of Cracking in Feedwater Piping Adjacent to the Steam Generators in Nine Pressurized Water Reactor Plants.
Technical rept.,
Alfred Goldberg, Ronald D. Streit, and Robert G. Scott. Oct 80, 202p UCRL-53000

Cracking in ASTM A106-B and A106-C feedwater piping was detected near the inlet to the steam generators in a number of pressurized water reactor plants. The authors received sections with cracks from nine of the plants with the objective of identifying the cracking mechanism and assessing various factors that might contribute to this cracking. The authors observed variations in (1) piping surface irregularities, (2) corrosion-product, pit, and crack morphology, (3) surface elemental and crystal structure analyses, and (4) steel micros-

tructures and mechanical properties. However, with but two exceptions, namely, arrest bands and major surface irregularities, the authors were unable to relate the extent of cracking to any of these factors. Tensile and fracture toughness (J sub Ic and tearing modulus) properties were measured over a range of temperatures and strain rates. No unusual properties or microstructures were observed that could be related to the cracking problem. All crack surfaces contained thick oxide deposits and showed evidence of cyclic events in the form of arrest bands. Using transmission electron microscopy, the authors clearly observed fatigue striations on replicas of cleaned crack surfaces from one plant and possibly from three others. Calculations based on the observed striation spacings gave a value of Delta sigma = 150 MPa (22 ksi) for one of the major cracks. The direction of crack propagation was invariably related to the piping surface and not to the piping axis. These two factors are consistent with the proposed concept of thermally induced, cyclic, tensile surface stresses.

NUREG/CR-1723 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
A Nonlinear Sensitivity and Uncertainty Analysis in Support of the Blowdown Heat Transfer Program,
Y. Ronen, M. A. Bjerke, D. G. Cacuci, and J. Barhen. Nov 80, 49p ORNL/NUREG/TM-412
Contract W-7405-eng-26

A nonlinear uncertainty analysis methodology based on the use of first and second order sensitivity coefficients is presented. As a practical demonstration, an uncertainty analysis of several responses of interest is performed for Test 177, which is part of a series of tests conducted at the Thermal-Hydraulic Test Facility (THTF) of the ORNL Engineering Technology Division Pressurized Water Reactor-Blowdown Heat Transfer (PWR-BDHT) program. These space- and time-dependent responses are: mass flow rate, temperature, pressure, density, enthalpy, and water quality - in several volumetric regions of the experimental facility. The analysis shows that, over parts of the transient, the responses behave as linear functions of the input parameters; in these cases, their standard deviations are of the same order of magnitude as those of the input parameters. Otherwise, the response exhibit nonlinearities and their standard deviations are considerably larger. The analysis also shows that the degree of nonlinearity of the responses is highly dependent on their volumetric locations.

NUREG/CR-1742 PC **A05**/MF **A01**
Battelle Columbus Labs., OH.
Steam-Water Mixing and System Hydrodynamics Program - Task 4.
Quarterly progress rept. 1 Jan-31 Mar 80,
Aryeh Segev, L. J. Flanigan, J. S. K. Liu, and R. P. Collier. Oct 80, 90p BMI-2065
Contract NRC-04-76-293-04
See also report for Oct-Dec 79, NUREG/CR-1657.

During this quarter the authors concluded the development of the mechanistic model for ECC penetration and further analyzed results from countercurrent flow condensation tests in tubes. Experimental work during this quarter includes hot wall tests in the 2/15-scale model with steady and ramped steam flows.

NUREG/CR-1743 PC **A03**/MF **A01**
Battelle Columbus Labs., OH.
Steam-Water Mixing and System Hyrodynamics Program - Task 4.
Quarterly progress rept. 1 Apr-30 Jun 80,
Aryeh Segev, Lawrence J. Flanigan, and Robert P. Collier. Oct 80, 48p BMI-2067
Contract NRC-04-76-293-04

During this quarter we analyzed results from hot wall tests in the 2/15-scale model with a scaled size break and steady core steam flow. Experimental work this quarter included studies of blowdown and flashing and hot wall tests with an oversized break leg.

N81-10831/8 PC **A02**/MF **A01**
von Karman Inst. for Fluid Dynamics, Rhode-Saint-Genese (Belgium).
Post Accidental Heat Removal (PAHR): European Program. Fundamental, Experimental, and Theoretical Work on the PAHR Situation.
C. Joly, and J. M. Buchlin. Mar 79, 23p VKI-PREPRINT-1979-9
Submitted for Publication. Presented at Informal Meeting, Brussels, 5-6 Mar. 1979.

Out-of-pile experiments with simulant materials and the development of a theoretical approach leading to a better understanding of the Post Accident Heat Removal (PAHR) situation are discussed. A table is presented which summarizes the main phenomena to be analyzed by the PAHR program. The test facilities which are to be developed within the scope of the study are described. Some preliminary results are presented in terms of a two phase model in which only conductive heat transfer is considered.

ORNL/TM-7376 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Power Generation Costs for Alternate Reactor Fuel Cycles.
G. R. Smolen, and J. G. Delene. Sep 80, 47p
Contract W-7405-ENG-26

The total electric generating costs at the power plant busbar are estimated for various nuclear reactor fuel cycles which may be considered for power generation in the future. The reactor systems include pressurized water reactors (PWR), heavy-water reactors (HWR), high-temperature gas cooled reactors (HTGR), liquid-metal fast breeder reactors (LMFBR), light-water pre-breeder and breeder reactors (LWPR, LWBR), and a fast mixed spectrum reactor (FMSR). Fuel cycles include once-through, uranium-only recycle, and full recycle of the uranium and plutonium in the spent fuel assemblies. The U sub 3 O sub 8 price for economic transition from once-through LWR fuel cycles to both PWR recycle and LMFBR systems is estimated. Electric power generation costs were determined both for a reference set of unit cost parameters and for a range of uncertainty in these parameters. In addition, cost sensitivity parameters are provided so that independent estimations can be made for alternate cost assumptions. (ERA citation 05:034934)

PB81-119299 PC **A08**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Energy Lab.
Development and Testing of the Three Dimensional, Two-Fluid Code THERMIT for LWR Core and Subchannel Applications.
Progress rept. Oct 78-Sep 79,
J. E. Kelly, and M. S. Kazimi. Dec 79, 157p MIT-EL-79-046
Sponsored in part by Boston Edison Co., MA., Consumers Power Co., Jackson, MI., Northeast Utilities Service Co., Hartford, CT., Public Service Electric and Gas Co., Newark, NJ., and Yankee Atomic Electric Co., Boston, MA.

The report describes the effort involved in the development and assessment of the two fluid computer code THERMIT for light water reactor core and subchannel analysis. The developmental effort required a reformulation of the coolant to fuel rod coupling, found in the original THERMIT code, as well as an improvement in the fuel rod modeling capability. With these modifications, THERMIT now contains consistent thermal-hydraulic models capable of traditional coolant-centered subchannel analysis. As such, this code represents a very useful design tool for LWRs. The advantages of THERMIT are that it contains the sophisticated two-fluid, two-phase flow model as well as an advanced numerical solution technique. Consequently, mechanical and thermal non-equilibrium between the liquid and the vapor can be explicitly accounted for and, furthermore, no restrictions are placed on the type of flow conditions. However, the formulation of the two-fluid model introduces interfacial exchange terms which have controlling influence on the two-fluid equations. Therefore, the models which represent these exchange terms must be carefully defined and assessed. In view of the importance of these interfacial exchange terms, a systematic evaluation of these models has been undertaken. This effort has been aimed at validating THERMIT for both subchannel and core-wide applications.

PB81-119729 PC **A11**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Energy Lab.
Sensitivity Analysis of the Reactor Safety Study.
Final rept.,
William J. Parkinson, Norman C. Rasmussen, and William D. Hinkle. Jan 79, 236p MIT-EL-79-008, MIT-NE-225
Sponsored in part by Northeast Utilities Service Co., Hartford, CT., and Yankee Atomic Electric Co., Boston, MA.

The Reactor Safety Study (RSS) or Wash 1400 developed a methodology estimating the public risk from light water nuclear reactors. In order to give further insights into this study, a sensitivity analysis has been performed to determine the significant contributors to risk for both the PWR and BWR. The sensitivity to variation of the point values of the failure probabilities reported in the RSS was determined for the safety systems identified therein, as well as for many of the generic classes from which individual failures contributed to system failures. Increasing as well as decreasing point values were considered. An analysis of the sensitivity to increasing uncertainty in system failure probabilities was also performed. The sensitivity parameters chosen were release category probabilities, core melt probability, and the risk parameters of early fatalities, latent cancers and total property damage. The latter three are adequate for describing all public risks identified in the RSS. The results indicate reductions of public risk by less than a factor of two for factor reductions in system or generic failure probabilities as high as one hundred. There also appears to be more benefit in monitoring the most sensitive systems to verify adherence to RSS failure rates than to backfitting present reactors. The sensitivity analysis results do indicate, however, possible benefits in reducing human error rates.

RIG-7 PC **A11**/MF **A01**
Technische Univ., Graz (Austria). Reaktorinstitut.
Report on the Interpretation of Critical Experiments in the Siemens-Argonaut-Reactor Graz to Study Water Ingress into Spherical Elements.
F. Schuerrer, and R. D. Neef. Apr 79, 232p
In German.
U.S. Sales Only.

The experiments described are of interest in the study of water contamination in HTR fuel elements. The Siemens Argonaut Reactor (SAR) has been considered as a research tool for a simulation experiment. Following a brief description of the SAR, planned programs are discussed in 'dry' and 'wet' cores. Detector foil types and locations are noted. A theoretical model is developed and nuclide concentrations estimated in the various spectral zones. Reactivity calculations have been made and are summarised for various H sub 2 O percentage concentrations. The discussion is supported by simplified core layout diagrams and graphs of core flux distributions. Neutron diffusion and spectra calculations are referenced to computer programs used by KFA-Juelich, published elsewhere, and include GAM, THERMOS, MUPO and EXTERMINATOR-2. (Atomindex citation 11:518221)

UCID-18781 PC **A09**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Fire Protection Countermeasures for Containment Ventilation Systems.
N. Alvares, D. Beason, V. Bergman, J. Creighton, and H. Ford. 25 Aug 80, 190p
Contract W-7405-ENG-48

The goal of this project is to find countermeasures to protect High Efficiency Particulate Air (HEPA) filters, in exit ventilation ducts, from the heat and smoke generated by fire. Initially, methods were developed to cool fire-heated air by fine water spray upstream of the filters. It was recognized that smoke aerosol exposure to HEPA filters could also cause disruption of the containment system. Through testing and analysis, several methods to partially mitigate the smoke exposure to the HEPA filters were identified. A continuous, movable, high-efficiency prefilter using modified commercial equipment was designed. The technique is capable of protecting HEPA filters over the total time

duration of the test fires. The reason for success involved the modification of the prefiltration media. Commercially available filter media has particle sorption efficiency that is inversely proportional to media strength. To achieve properties of both efficiency and strength, rolling filter media were laminated with the desired properties. The approach was Edisonian, but truncation in short order to a combination of prefilters was effective. The application of this technique was qualified, since it is of use only to protect HEPA filters from fire-generated smoke aerosols. It is not believed that this technique is cost effective in the total spectrum of containment systems, especially if standard fire protection systems are available in the space. But in areas of high-fire risk, where the potential fuel load is large and ignition sources are plentiful, the complication of a rolling prefilter in exit ventilation ducts to protect HEPA filters from smoke aerosols is definitely justified. (ERA citation 05:036165)

UCRL-15265 PC **A02**/MF **A01**
Teknekron Research, Inc., McLean, VA.
Inspection Methods for Physical Protection. Task II. Review of Research Reactor Licensees' Physical Security Practices.
3 Jul 80, 15p
Contract W-7405-ENG-48

Security systems and security procedures for the AFRRI reactor, the University of Maryland TRIGA reactor, and the University of Virginia CAVALIER and UVAR reactors are described. (ERA citation 05:036677)

ZJE-223 PC **A03**/MF **A01**
Skoda, Pilsen (Czechoslovakia). Zavod Vystavba Jadernych Elektraren.
Simulation of the Dynamics of a LWR Power Plant with the Use of a Hybrid Computing System.
J. Machalicek, and J. Sedlacek. 1978, 37p
U.S. Sales Only.

The simulation is discussed of the dynamics of the primary loop of the nuclear power plant with light water reactor using the hybrid computer. The mathematical model serving as a basis for the design of the analog computer circuit diagram, the method of analog connections and control program checking are described. A test problem and its solution are presented. Hybrid computer EAI 690 was used to solve the presented problem. (Atomindex citation 11:514749)

ZJE-226 PC **A04**/MF **A01**
Skoda, Pilsen (Czechoslovakia). Zavod Vystavba Jadernych Elektraren.
Computational Programme DYTLO for Solving Pressure-Water-Circuit Dynamics. Part I. Method of Computation.
P. Krizek. 1978, 55p
U.S. Sales Only.

The computational programme DYTLO is described (dynamics of a pressurized water circuit) intended for numerical solution of the dynamics of unsteady processes in a pressurized water system such as e.g. PWR primary circuit. The possible presence of a two-phase coolant in the system is taken into account. The description of the chosen computational model of the circuit and the mathematical method of the problem solution are also presented. (Atomindex citation 11:514748)

ZJE-229 PC **A02**/MF **A01**
Skoda, Pilsen (Czechoslovakia). Zavod Vystavba Jadernych Elektraren.
Analysis of Relative Motion Between PWR Pressure Vessel and Its Internals.
L. Pecinka, and V. Zeman. 1978, 21p
U.S. Sales Only.

A mathematical model is analyzed describing the relative motion of the PWR pressure vessel and core vessel. The actual system of exciting forces may be replaced by a linear discrete dynamic model with four axially asymmetrical solid bodies linked with four springs. In rated operation pressure fluctuations in the coolant flow and those due to main circulating pump operation affect the reactor internals. The IDENT program written in ALGOL developed for practical calculations using the model is briefly described.. (Atomindex citation 11:514335)

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AECB-1101 PC **A02**/MF **A01**
Atomic Energy Control Board, Ottawa (Ontario).
Brief to the Quebec Parliamentary Commission on Energy.
P. E. Hamel. Feb 77, 17p
In French.
U.S. Sales Only.

The controls and regulations in force in Canada are reviewed and their anticipated evolution in the light of changes in the nuclear fuel cycle are indicated. (Atomindex citation 11:529110)

AECB-1107 PC **A02**/MF **A01**
Atomic Energy Control Board, Ottawa (Ontario).
Transportation of Radioactive Materials by Air.
J. M. Jardine. Apr 77, 14p
U.S. Sales Only.

Canadian regulations for air transportation of radioactive materials are based on the IAEA regulations. The Atomic Energy Control Board is responsible for enforcement. The IAEA regulations are summarized in this report. A review of 402 210 shipments by air, road, rail, and sea in Canada between 1957 and 1975 reveals 61 incidents. Of the 36 incidents involving air transportation, one resulted in package failure and an increase in radiation and two resulted in package contents being spilled. (Atomindex citation 11:529106)

AECL-6425 PC **A03**/MF **A01**
Atomic Energy of Canada Ltd., Pinawa (Manitoba). Whiteshell Nuclear Research Establishment.
Fuel Cycles. A Bibliography of AECL Publications.
N. J. Hawley. Jul 79, 27p
U.S. Sales Only.

AECL publications on fuels and fuel cycles used in CANDU reactors are listed chronologically. (Atomindex citation 11:523406)

AECL-6535 PC **A02**/MF **A01**
Atomic Energy of Canada Ltd., Chalk River (Ontario). Chalk River Nuclear Labs.
New Technology and Fuel Cycles.
A. J. Mooradian. Jun 79, 6p CONF-7811171-1
Conference on Canadian nuclear policy, Mont Ste Marie, Quebec, Canada, 8 Nov 1978.
U.S. Sales Only.

The means of improving uranium utilization in nuclear power reactors are reviewed with respect to economic considerations, assurance of adequate fuel supplies and risk of weapons proliferation. Reference is made to what can be done to improve fuel economy in existing reactor systems operating on a once-through fuel cycle and the potential for improvement offered by fuel recycle in those systems. The state of development of new reactor systems that offer significant savings in uranium utilization is also reviewed and conclusions are made respecting the policy implications of the search for fuel economy. (Atomindex citation 11:523409)

AECL-6577 PC **A02**/MF **A01**
Atomic Energy of Canada Ltd., Chalk River (Ontario). Chalk River Nuclear Labs.
Long-Term Storage of Fuel in Water.
C. E. L. Hunt, J. C. Wood, and A. S. Bain. Jun 79, 18p CONF-7906142-2
19. Canadian Nuclear Association annual international conference, Toronto, Canada, 10 Jun 1979.
U.S. Sales Only.

Two intact and two defective elements stored for 11 years and two intact elements stored for 16 years were metallographically examined in 1978. The experimental bundle stored for 11 years showed no differences between the original examination and the present one. The NPD bundle, which had been stored for 16 years, showed no differences from other NPD bundles which had been examined shortly after discharge from the reactor. In parallel, fission product induced stress corrosion cracking of Zircaloy-4 below 373 K is being studied. Although cracks can grow by iodine stress corrosion, the depth of starter crack and amount of applied stress required are so large that stress corrosion cracking of stored fuel is very unlikely. (Atomindex citation 11:529022)

CONF-800460-5 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Quantitative Differential Thermal Analysis Study of the U sub 3 O sub 8 -Al Thermite Reaction.
A. E. Pasto, G. L. Copeland, and M. M. Martin. 1980, 25p
Contract W-7405-ENG-26
82. annual American Ceramic Society meeting, Chicago, IL, USA, 27 Apr 1980.

Concerns about proliferation resistance of nuclear fuel cycles and fuels have prompted a reinvestigation of U sub 3 O sub 8 -Al cermet fuels currently being used in research and test reactors. In particular, higher loadings of U sub 3 O sub 8 are being considered. These new fuel compositions are in the region of maximum possible thermal energy release from the high-temperature thermite reaction between the U sub 3 O sub 8 and aluminum components. This study was initiated to quantitatively measure the amount of reaction heat evolved. A differential thermal analysis system was calibrated with materials of known heat of reaction. Subsequently, specimens of high-uranium-loaded U sub 3 O sub 8 -Al powder mixtures were analyzed. Thermite reaction heat measured for these specimens was much lower than expected. Specimens of simulated fuel plates showed similar low results. Possible reasons for this behavior are discussed. (ERA citation 05:036167)

CONF-800670-3 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Redox Measurements in Molten Urania.
A. T. Chapman, J. Brynestad, and G. W. Clark. 1980, 27p
Contract W-7405-ENG-26
European thermophysical properties conference, Antwerpen, Belgium, 30 Jun 1980.

Urania samples were internally melted using induction heating in controlled H sub 2 O/H sub 2 and CO sub 2 /CO gas mixtures and the resultant changes in stoichiometry of the liquid measured. The temperature extremes of the pellets (interior vs surface) were employed to calculate the upper and lower limits of the oxygen pressures reacting with the molten oxide. Comparison of the redox equilibria (as determined by the molten zone temperature of 3150 exp 0 K) with literature information for condensed UO/sub 2+x/ yielded a self-consistent phase diagram for the hyperstoichiometric oxide up to the liquidus curves. The experimental uncertainties and potential advantages in utilizing the internal zone technique to assess redox equilibria in nonstoichiometric molten refractory oxides are considered. (ERA citation 05:036050)

CONF-800943-(Sum.) PC **A08**/MF **A01**
American Nuclear Society, Oak Ridge, TN.
Fuel Cycles for the 80'S.
1980, 170p
National topical meeting of fuel cycles for the 80's, Gatlinburg, TN, USA, 29 Sep 1980.

Papers presented at the American Nuclear Society's topical meeting on the fuel cycle are summarized. Present progress and goals in the areas of fuel fabrication, fuel reprocessing, spent fuel storage, accountability, and safeguards are reported. Present governmental policies which affect the fuel cycle are also discussed. Individual presentations are processed for inclusion in the Energy Data Base. (ERA citation 05:036057)

DOE/EDP-0056 PC **A03**/MF **A01**
Department of Energy, Washington, DC. Office of Environment.
Environmental Development Plan: Special Nuclear Materials Production.
Jul 80, 42p

This Environmental Development Plan includes the process steps and facilities necessary for the production of plutonium and tritium for Government needs and the production of some other radioactive materials that will be used for heat and radiation sources by domestic and international customers. The production reactors and the spent fuel processing plants and their effluents are discussed, but the defense wastes from them are treated in a separate EDP. The scope does not include transportation, decontamination and decommissioning, safeguards and security, or use of the SNM products. (ERA citation 05:037182)

DOE-tr-122 PC **A07**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Reaktorentwicklung.
Theoretical and Experimental Investigation of the Nonlinear Structural Dynamics of Fast Breeder Fuel Elements.
R. Liebe. 146p
C KFK--2584, April 1978.Work performed under United States-W. Germany Fast Reactor Exchange Program.
U.S. Sales Only.

This study describes theoretical and experimental investigations of the dynamic deformation behavior of single and clustered fuel elements under local fault conditions in a Fast Breeder Reactor core. In particular an energetic molten-fuel-coolant-interaction (FCI) is assumed in one subassembly with corresponding pressure pulses, which may rupture the wrapper and load the adjacent fuel elements impulsively. Associated coherent structural deformation may exceed tolerable limits and damage the control rods. (ERA citation 05:036652)

DP-MS-80-11 PC **A03**/MF **A01**
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab.
Hot Cell Studies of Tritium Removal from and Dissolution of an Irradiated Thoria Fuel.
J. B. Pickett. 1980, 27p CONF-800943-8
Contract AC09-76SR00001
National topical meeting of fuel cycles for the 80's, Gatlinburg, TN, USA, 29 Sep 1980.

Tritium removal and dissolution studies on an irradiated thoria-based fuel were conducted in the High Level Caves at the Savannah River Laboratory (SRL). The objectives of these studies were to define the effects of key process-related parameters on tritium evolution and subsequent dissolution. The test program at SRL determined the effects on tritium removal of particle size, heating temperature, oxidation, and agitation. ThO sub 2 / UO sub 2 (95%/5%) fuel from the Elk River Reactor, irradiated to about 12,000 MWD/MTHM and cooled for about 12 years, was used in the tests. The thoria/urania fuel pellets were separated from the stainless steel cladding and were divided into size fractions to determine the particle-size distribution resulting from the decladding process. In the tritium removal tests, the effect of heating several different particle-size fractions was studied at temperatures ranging from 600 to 1000 exp 0 C in the presence of air for 10 to 30 hours. Each of the roasted samples (about 100 grams) was subsequently dissolved in refluxing Thorex reagent (13M HNO sub 3 , 0.05M HF, and 0.1M Al(NO sub 3) sub 3) to determine the residual tritium. The amount of insoluble residue remaining after the dissolution was determined and characterized. (ERA citation 05:036079)

DP-MS-80-5 PC **A02**/MF **A01**
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab.
Slurry Calcination Process for Conversion of Aqueous Uranium and Plutonium to a Mixed Oxide Powder.
M. K. Jones, and W. J. Jenkins. 1980, 23p
CONF-800943-10
Contract AC09-76SR00001
National topical meeting of fuel cycles for the 80's, Gatlinburg, TN, USA, 29 Sep 1980.

Pilot plant studies indicate that a slurry calcination process for conversion of uranium and plutonium solutions to a mixed oxide powder can be operated at a plant scale. (ERA citation 05:036053)

GA-A-15895 PC **A02**/MF **A01**
General Atomic Co., San Diego, CA.
GCFR Core Cladding Temperature Limits.
J. M. Day, and M. P. LaBar. May 80, 22p CONF-800648-15
Contract AT03-76SF71023
GCFRP program technical review meeting, San Diego, CA, USA, 4 Jun 1980.

This paper reviews the phenomena that affect selection of the GCFR cladding faulted temperature limit. The limiting effects are determined to be clad melting, strength and oxidation rate. The selected temperature limit is 1300 exp 0 C (2370 exp 0 F). The limits for normal, upset and emergency events are also breifly reviewed, and some changes under consideration are discussed. (ERA citation 05:036656)

GA-A-15904 PC **A03**/MF **A01**
General Atomic Co., San Diego, CA.
Design Configuration of GCFR Core Assemblies.
M. P. LaBar, G. E. Lee, and R. J. Meyer. May 80, 34p CONF-800648-11
Contract AT03-76SF71023
GCFRP program technical review meeting, San Diego, CA, USA, 4 Jun 1980.

The current design configurations of the core assemblies for the gas-cooled fast reactor (GCFR) demonstration plant reactor core conceptual design are described. Primary emphasis is placed upon the design innovations that have been incorporated in the design of the core assemblies since the establishment of the initial design of an upflow GCFR core. A major feature of the design configurations is that they are prototypical of core assemblies for use in commercial plants; a larger number of the same assemblies would be used in a commercial plant. (ERA citation 05:036657)

GA-A-15915 PC **A02**/MF **A01**
General Atomic Co., San Diego, CA.
Oxidation of 316 Stainless Steel and Other Alloys in Prototypic GCFR Environments.
R. T. Acharya. May 80, 13p CONF-800648-17
Contract AT03-76SF71023
GCFRP program technical review meeting, San Diego, CA, USA, 4 Jun 1980.

The oxidation behavior of type 316 stainless steel and candidate advanced alloys for the gas-cooled fast reactor (GCFR) is being investigated at General Atomic Company. The test program consists of oxidation tests in prototypic GCFR environments. Two tests have been completed to date and a third test is under way. The first test was performed in an environment containing a hydrogen/water ratio of 10. The oxidation behavior of all the alloys was good to excellent in this environment. Preferential oxidation of chromium was responsible for this behavior. The second test was performed in an environment containing a hydrogen/water ratio of 0.25, where both chromium and iron oxides are thermodynamically stable. Some of the alloys and some of the ribbed type 316 stainless steel test specimens showed unacceptable oxidation resistance in this environment. In the third test, presently under way, two different pretreatment procedures are being used to control the poor oxidation behavior observed in the second test. Early results show some degree of success. (ERA citation 05:036659)

IAEA-R-2118-F PC **A08**/MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Application of Routine Methods for the Inspector Fuel Burn-Up Determination and Identification of Displacement of Spent Fuel Elements by Dummy Elements. Final Report for the Period 15 December 1977 - 15 June 1979.
S. Rohar. Aug 79, 163p
U.S. Sales Only.

Fourteen irradiated assemblies were analyzed using nondestructive high resolution gamma spectrometry (HRGS). Measured and calculated (on the basis of calorimetric data) axial burnup profiles and average burnup values were compared. The measurements of spent fuel were performed in the Bohunice A-1 dry hot cell by using a proper collimating system and the standard Agency equipment, consisting of PGT intrinsic Ge detectors and Silena MCA with 1024 channels. The method of exp 134 Cs/ exp 137 Cs fission product activity ratio was used for burnup determination. It was found that the burnup values for 14 measured assemblies determined by HRGS were systematically lower than the calculated values with about 4-5%. The difference between the nondestructively determined burnup value of the 2N0053 assembly (average over 11 measured points) and destructively determined burnup (average over 19 measured points) was less than 2%. Passive neutron measurements of the irradiated assembly showed that the neutron counting rate was high enough for practical use and that the neutron and gamma profiles were similar and close to the burnup profile.ferent types of assemblies. (Atomindex citation 11:518162)

Juel-1606 PC **A06**/MF **A01**
Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Reaktorwerkstoffe und Heisse Zellen.
Investigations of the Fabrication of Spherical Carbide Containing Uranium Dioxide Particles by the Hydrolysis Process.
Diss,
C. R. Puschel, R. Foerthmann, A. Naoumidis, and H. Nickel. Jul 79, 106p
In German.
U.S. Sales Only.

Investigations to adapt the Hydrolysis Process for the fabrication of carbide containing uranium oxide kernels for advanced coated fuel particles are described. From five different carbon black varieties the best suitable carbon black is selected and a method developed to get a homogeneous dispersion of the carbon black in a surfactant-free solution with C/U atomic ratios between 0,38 and 1,5. The process steps degassing, reduction, presintering and carbothermic reduction of the spherical particles are investigated in detail for a reproducible fabrication of carbide containing uranium oxide kernels. Methods are developed for a continuous control of the carbothermic reduction by measuring the CO release rate, for the graphical determination of the oxygen content in the carbide phase from measured C/U and O/U ratios and for determining the amount of carbide phase in the kernels by quantitative X-ray analysis. (Atomindex citation 11:518060)

Juel-1612 PC **A05**/MF **A01**
Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.).
Potential of Thorium Use in the HTR Reactor. Uranium Consumption and Cost of Long-Term HTR Strategies Compared with LWR and FBR.
P. Engelmann, U. Hansen, G. Kolb, D. Leushacke, and E. Teuchert. Aug 79, 91p
In German.
U.S. Sales Only.

In this investigation, several types of reactors and fuel circulations are dealt with as they refer to the region of the Federal Republic of Germany and are compared with each other as to their need for uranium and their costs until 2100. This includes also an investigation covering the effects of a postponed application of uranium-saving reactors, a delayed reprocessing and two variants of the nuclear energy's contribution to electricity generation. After today's light water reactor (LWR) of the pressure water reactor type (DWR) and the sodium-cooled fast breeder (SBR) which is being developed, the technically rather developed helium-cooled high temperature reactor (HTR) is dealt with as another system. The high temperature reactor is, because of its high coolant temperatures, not only suitable as a nuclear power plant, but can also be used to substitute fossile energy sources on the heat market and is being developed in Germany also for use as process heat reactor for nuclear coal gasification. Here the application of nuclear energy is only considered with regard to the region of power generation. Besides the case of the LWR and HTR-operation without reprocessing and fuel recycling for all reactor systems, the calculations also take into consideration the case of the closed fuel recycling. While LWR and SBR are based on the uranium-plutonium-fuel recycling, the thorium-uranium fuel circulation is considered for the HTR with globular fuel elements. As investigations made until today are generally restricted to the system LWR/SBR and the uranium-plutonium circulation, a main concern of the investigations presented here is to show the potential of the Thorium-utilization in high-temperature reactors and to determine how this system can also be applied during the time period concerned to set up a nuclear energy strategy which is safe and profitable as far as the uranium supply is concerned. (Atomindex citation 11:529061)

Juel-1620 PC **A05**/MF **A01**
Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Reaktorwerkstoffe und Heisse Zellen.
Irradiation Performance of Coated Fuel Particles with Fission Product Retaining Kernel Additives.
R. Foerthmann. Oct 79, 100p

In German.
U.S. Sales Only.

The four irradiation experiments FRJ2-P17, FRJ2-P18, FRJ2-P19, and FRJ2-P20 for testing the efficiency of fission product-retaining kernel additives in coated fuel particles are described. The evaluation of the obtained experimental data led to the following results: - zirconia and alumina kernel additives are not suitable for an effective fission product retention in oxide fuel kernels, - alumina-silica kernel additives reduce the in-pile release of Sr 90 and Ba 140 from BISO-coated particles at temperatures of about 1200 exp 0 C by two orders of magnitude, and the Cs release from kernels by one order of magnitude, - effective transport coefficients including all parameters which contribute to kernel release are given for (Th,U)O sub 2 mixed oxide kernels and low enriched UO sub 2 kernels containing 5 wt.% alumina-silica additives: 10g sub(K)/cm exp 2 s exp -1 = - 36 028/T + 6,261 (Sr 90), 10g Dsub(K)/cm exp 2 c exp -2 = - 29 646/T + 5,826 (Cs 134/137), alumina-silica kernel additives are ineffective for retaining Ag 110 m in coated particles. However, also an intact SiC-interlayer was found not to be effective at temperatures above 1200 exp 0 C, - the penetration of the buffer layer by fission product containing eutectic additive melt during irradiation can be avoided by using additives which consist of alumina and mullite without an excess of silica, - annealing of LASER-failed irradiated particles and the irradiation test FRJ12-P20 indicate that the efficiency of alumina-silica kernel additives is not altered if the coating becomes defect. (Atomindex citation 11:514346)

JAERI-M-8200 PC **A02**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Evaluation of Circumferential Temperature Distribution of Zry-4 Cladding Based on Oxide Layer Thickness in NSRR Experiments.
S. Yanagihara, S. Shiozawa, and S. Saito. May 79, 22p
In Japanese.
U.S. Sales Only.

Maximum temperature distributions around circumference of the Zry-4 cladding of test fuel rods irradiated in the NSRR experiments were evaluated on the basis of measured oxide layer thickness. The relationship between maximum cladding surface temperature and oxide layer thickness obtained in the NSRR experiments was used to evaluate circumferential temperature distributions. Following are the results: (1) The depression of maximum temperature at thermocouple positions was estimated from the drop of oxide layer thickness. It was possibly caused by the fin cooling effect of thermocouples. (2) Large temperature differences 200 exp 0 C-600 exp 0 C around circumference of Zry-4 cladding where estimated in the temperature range of cladding over 1200 exp 0 C. Because maximum temperature distribution around the circumference was sinusoidal, the temperature differences were caused by the eccentricity of UO sub 2 pellets. These phenomena would also be observed in other experiments than NSRR. (Atomindex citation 11:514315)

JAERI-M-8267 PC **A02**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
UO Sub 2 -Zircaloy Chemical Reactions in the NSRR Experiments.
S. Shiozawa, S. Saito, and S. Yanagihara. Jun 79, 22p
In Japanese.
U.S. Sales Only.

Chemical reactions between UO sub 2 fuel and Zircaloy-4 cladding material under reactivity initiated accident (RIA) conditions are described. Post-irradiation examination of the fuel rods, in the NSRR experiments, was made with an optical microscope and an electron microprobe analyzer. In the fuel rods subjected to around or more than failure threshold energy deposition (approximately 260 cal/g.UO sub 2), UO sub 2 -Zircaloy reaction layer is observable. Observation of the layer with an electron microprobe analyzer shows that the layer consists of (alpha -Zr(O), U), (U or (U, Zr) alloy) and (alpha -Zr(O)) phases. It is possible that due to the thermodynamic instability between UO sub 2 and Zircaloy, UO sub 2 is partly reduced by Zircaloy at energy depositions around the failure threshold, so that UO sub 2 -Zircaloy reaction layer forms between these two. The present results are in agreement with those of out-of-pile tests and in-pile PCM experiments in the phases formed, though the test conditions are different. The UO sub 2 -Zircaloy reaction occurred invaliably in all the fuel rods which were tested under different conditions and failed due to cladding embrittlement. The binding of pellets and cladding produced by UO sub 2 -Zircaloy reaction does not permit thermal contraction of the cladding in quenching. The UO sub 2 -Zircaloy reaction thus plays an important role in the brittle fracture of fuel rods. (Atomindex citation 11:514339)

JAERI-M-8274 PC **A04**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Design and out-of-Pile Test Results of NSRR High-Pressure Capsule.
S. Kobayashi, and S. Toyokawa. Jun 79, 53p
In Japanese.
U.S. Sales Only.

Design and operation results are described of a mock-up of an high-pressure test capsule to be used in RIA fuel behavior tests under simulated power reactor operating conditions. The mock-up capsule was found to meet most of its intended requirements. The practical high-pressure capsule for in-pile tests will be designed on the basis of mock-up results. (Atomindex citation 11:514420)

JAERI-M-8296 PC **A03**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Failure of the Capsule 74F-2A for Fuel Compacts Irradiation.
H. Nakata, Y. Nomura, H. Itoh, I. Arase, and S. Muraoka. Jul 79, 46p
In Japanese.
U.S. Sales Only.

Capsule 74F-2A is for irradiation at 1600 exp 0 C for VHTR fuel compacts in JMTR. However, an irradiation with the capsule was suspended and the capsule was taken out, because the compacts temperature suddenly rose when the reactor power had reached to 40 MW and FPs gas was released from the compacts container during a reactor power decrease about 1-hour after the temperature rise. Subsequent examinations showed that the trouble was caused by sudden gas evolution from the flame-sprayed molybdenum coating on a graphite sleeve containing fuel compacts when the sleeve temperature exceeded a certain level. Described are the situation of temperature rise and FPs gas release, the abnormal phenomena viewed in design, fabrication and inspection of the capsule, the results of its dismounting in a hot cell, the gas releases from various capsule structural materials at elevated temperatures, and the cause as above revealed, and countermeasures to be taken in future. (Atomindex citation 11:518225)

JAERI-M-8299 PC **A03**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Construction and Performance Test of the Apparatus for Measuring Thermal Properties of U-Pu Mixed Carbide Fuel.
S. Fukushima, J. Abe, and M. Kurihara. Jun 79, 49p
In Japanese.
U.S. Sales Only.

Apparatus was designed and constructed of measure thermal properties such as thermal diffusivity, heat capacity and thermal conductivity in a temperature range of 500 exp 0 to 1800 exp 0 C by laser flash method. It consists of a high temperature furnace, a rubby laser as a source of heat pulses, a PbS cell as a temperature change detector, a high-speed memory of data transients, a laser power meter and an air atmosphere glove box. The furnace alone is enclosed in the glove box whose atmosphere can be changed to argon in once-through when required. The mechanical noise when enclosing in the glove box is suppressed by setting an optical measurement system on the optical bench, anchoring the sources of noise onto the laboratory floor and preventing propagation of the noise. The accuracy of measurement of the thermal diffusivity for standard samples such as graphite(AXM-5Q) and pure iron was less than +-3% in the temperature range of 500 exp 0 to 1800 exp 0 C. The heat capacities measured for graphite(AXM-5Q) and alumina attached with a heat absorption disk were in agreement with those in the literature within +-5% in the temperature range of 500 exp 0 to 1000 exp 0 C and within +-10% in that of 1000 exp 0 to 1500 exp 0 C. These results of performance tests show its usefulness for Pu-containing fuel. (Atomindex citation 11:525722)

JAERI-M-8312 PC **A03**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Design, Construction and Performance Test of the Analysis Lines of Mixed Uranium-Plutonium Carbide and Nitride Fuels for LMFBR.
M. Handa, A. Maeda, K. Shiozawa, and A. Hoshino. Jul 79, 28p
In Japanese.
U.S. Sales Only.

Design, construction and performance test of the analysis lines of uranium, plutonium, carbon, nitrogen and oxygen in mixed uranium-plutonium carbide and nitride fuels are described. Since the fuels are chemically unstable in the air, they are sealed before analysis in metallic capsules using dies and oil pressure in a high-purity argon atmosphere glove box. The capsules are then transferred respective apparatuses installed in four air-atmosphere glove boxes and the elements are determined. Commercial apparatuses were drastically modified for safe plutonium handling and easy maintenance in the glove boxes. Performance test with uranium compounds showed that the elements of the fuels could be determined successfully by the analysis lines. The methods developed of determining oxygen and nitrogen in oxide and nitride fuels containing them in high percentages are also described. (Atomindex citation 11:525723)

JAERI-M-8322 PC **A03**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Shielded Electron Microprobe Analyzer for Plutonium Fuel.
M. Handa, T. Ohmichi, K. Shiozawa, S. Fukushima, and Y. Arai. Jul 79, 45p
In Japanese.
U.S. Sales Only.

Design, construction and performance test of a shielded electron microprobe analyzer for plutonium fuel are described. In the analyzer, the following modifications were made to Shimadzu ASM-SX (analyzer): (1) a shield of tungsten alloy is incorporated between the sample and the X-ray detector to examine highly radioactive fuel, (2) a magnetic shield against beta -rays from the fuel is fitted to the electron detector, (3) a small sample-loading glove box is installed to transfer plutonium fuel safely to the analyzer, (4) a glove box containing a sample-surface treatment apparatus and a balance is connected to the sample-loading glove box, (5) for maintenance and repair of the analyzer by means of closed method, about thirty modifications are made. The performance test with nonradioactive materials showed that despite the above modifications, abilities of the original analyzer are all retained. And furthermore, the simulation test for irradiated fuel with exp 226 Ra of dose rate 40 mR/hr at 30 cm showed that the X-ray peaks to noise ratios are unchanged by using a pulse height selector of the X-ray detector. (Atomindex citation 11:525724)

ND-R-328(R) PC **A04**/MF **A01**
UKAEA, Risley (England). Nuclear Power Development Establishment.
FISPIN - A Computer Code for Nuclide Inventory Calculations.
R. F. Burstall. Oct 79, 51p
U.S. Sales Only.

The code is used for assessment of three groups of nuclides, the actinides, the fission products, and structural materials. The methods of calculation are described, together with the input and output of the code and examples of both. Recommendations are given for the best use of the code. (Atomindex citation 11:518686)

NUREG/CR-0849-V-1-2 PC **A03**/MF **A01**
Lawrence Livermore National Lab., CA.

Safeguards Material Control and Accounting Program: Quarterly Report January-March 1980,
Andrew J. Poggio, and Donald R. Dunn. Oct 80, 29p UCRL-52715-80-2
See also Volume 1, NUREG/CR-0849-V-1.

The report summarizes the activity of the Safeguards Material Control Accounting Program (MC&A) during the January-March 1980 quarter, conducted for the U.S. Nuclear Regulatory Commission at Lawrence Livermore National Laboratory. Described is progress made in the continued development of the Structured Assessment Approach (SAA) vulnerability methodology, particularly in preparing a user-oriented input-output interface and reducing the SAA's computer resource requirements. Also, a newly initiated technology transfer effort in which the NRC staff participated is detailed. Work continued in developing a value-impact methodology that focused on modeling alarm resolution; specifically, the procedures developed for eliciting the frequencies of false alarms are described. Additional support of the MC&A Upgrade Rule development, namely, analyzing the vulnerabilities of a generic minimal material accounting system to establish guidelines and checks and balances to prevent data falsification, is presented and a graphical procedure used in this effort is described. The report concludes with a brief description of the initial work performed in analyzing the role of an interfacility accounting system for safeguards assurance.

NUREG/CR-1571 PC **A04**/MF **A01**
Battelle Columbus Labs., OH.
Evaluating Strength and Ductility of Irradiated Zircaloy, Task 5.
Quarterly progress rept. Jul-Sep 79,
L. M. Lowry, A. J. Markworth, J. S. Perrin, and M. P. Landow. Oct 80, 60p BMI-2057
See also report for Apr-Jun 79, NUREG/CR-1392.

Fast neutron dosimetry was conducted to determine fast fluence of Oconee I, 1, 2, and 3 cycle fuel rods (Lots 2, 3, and 4). Additional tensile tests were performed on Oconee I archive and Lot 4 material. Tensile tests as a function of temperature and strain rate were conducted. Dynamic strain aging is presented as an explanation of the apparent anomalous behavior of tensile test results between 300 and 400C. Burst tests were completed on Lot 4 fuel rod cladding and a comparison of H.B. Robinson and Oconee I results compared. Additional expanding mandrel tests were conducted on Lots 2 and 3 material and also completed for Lot 4 cladding. Transient heating burst tests were also conducted on Lot 4 material. Modeling studies were continued using constitutive equations fitted to BCL tensile data.

NUREG/CR-1627 PC **A04**/MF **A01**
Oak Ridge National Lab., TN.
Heavy-Section Steel Technology Program Quarterly Progress Report for April-June 1980,
G. D. Whitman, and R. H. Bryan. Nov 80, 70p ORNL/NUREG/TM-401
Contract W-7405-eng-26
See also report for Jan-Mar 80, NUREG/CR-1477.

The Heavy-Section Steel Technology Program is an engineering research activity conducted by the Oak Ridge National Laboratory for the Nuclear Regulatory Commission. The program comprises studies related to all areas of the technology of materials fabricated into thick-section primary-coolant containment systems of light-water-cooled nuclear power reactors. The investigation focuses on the behavior and structural integrity of steel pressure vessels containing cracklike flaws. Current work is organized into five tasks: (1) program administration and procurement, (2) fracture mechanics analyses and investigations, (3) investigations of irradiated materials, (4) thermal shock investigations, and (5) pressure vessel investigations.

NUREG-0688 PC **A06**/MF **A01**
Nuclear Regulatory Commission, Washington, DC.
Computerized Reactor Pressure Vessel Materials Information System,
J. Strosnider, C. Monserrate, L. D. Kenworthy, and C. D. Tether. Oct 80, 118p
Prepared in cooperation with International Energy Associates Ltd.

A computerized information system for storage and retrieval of reactor pressure vessel materials data was established, as part of Task Action Plan A-11, Reactor Vessel Materials Toughness. Data stored in the system are necessary for evaluating the resistance of reactor pressure vessels to flaw-induced fracture. This report includes (1) a description of the information system; (2) guidance on accessing the system; and (3) a user's manual for the system.

ORNL/TM-7430 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Consolidated Fuel Reprocessing. Program Progress Report, April 1-June 30, 1980.
Sep 80, 48p
Contract W-7405-ENG-26

This progress report is compiled from major contributions from three programs: (1) the Advanced Fuel Recycle Program at ORNL; (2) the Converter Fuel Reprocessing Program at Savannah River Laboratory; and (3) the reprocessing components of the HTGR Fuel Recycle Program, primarily at General Atomic and ORNL. The coverage is generally overview in nature; experimental details and data are limited. (ERA citation 05:036081)

ORNL-5670 PC **A04**/MF **A01**
Oak Ridge National Lab., TN.
Metals and Ceramics Division. Annual Progress Report, Ending June 30, 1980.
Sep 80, 73p
Contract W-7405-ENG-26

Research is reported concerning: (1) engineering materials, including materials compatibility, mechanical properties, nondestructive testing, pressure vessel technology, and welding and brazing; (2) fuels and processes consisting of ceramic technology, fuel cycle technology, fuels evaluation, fuel fabrication and metals processing; and (3) materials science which includes, ceramic studies, physical metallurgy properties, radiation effects and microstructural analysis, metastable and superconducting materials, structure and properties of surfaces, theroretical research and x-ray research and applications. Highlights of the work of the metallographic group and the current state of the High-Temperature Materials Laboratory (HTML) and the Materials and Structures Technology Management Center (MSTMC) are presented. (ERA citation 05:036895)

PB81-121238 PC **A09**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Energy Lab.
Stainless Steel Clad for Light Water Reactor Fuels.
Final rept.,
J. E. Rivera, and J. E. Meyer. Jul 80, 185p MIT-EL-80-021
Sponsored in part by Northeast Utilities Service Co., Hartford, CT., Southern California Edison Co., Los Angeles.

Proper reactor operation and design guidelines are necessary to assure fuel integrity. The occurrence of fuel rod failures for operation in compliance with existing guidelines suggests the need for more adequate or applicable operation/design criteria. The intent of this study is to develop such criteria for light water reactor fuel rods with stainless steel clad and to indicate the nature of uncertainties in its development. The performance areas investigated herein are: long term creepdown and fuel swelling effects on clad dimensional changes and on proximity to clad failure; and short term clad failure possibilities during up-power ramps.

PB81-122855 PC **A04**/MF **A01**
Kansas State Univ., Manhattan.
Details of Criminological Investigations of Large-Valued Thefts Related to Nuclear Materials (Diversion Safeguards Program),
R. B. Leachman, and A. P. Cornelia. Jun 72, 69p KSU/DS-20, NSF-RA-X-72-026
Grant NSF-GI-9

Studies were made of five areas of criminology which have great similarity to the case of nuclear materials. Actual cases of crimes were analyzed by experts in law enforcement and criminal justice. To identify fields of analogous criminology, possible characteristics of nuclear material thefts were considered: total value, high unit cost, limited marketability, special technology for handling, and licensing. The items considered to be analogous to nuclear materials in these aspects were: narcotics, data (as exists in computer memories, tapes, or discs), precious metal and gems, objects of art, and weapons. A criminology survey was conducted in which 509 individuals received one or more questionnaires soliciting opinion responses. Sixty-five questionnaires were returned. Eighty-four individuals replied by letter indicating inadequate knowledge of the crimes being surveyed. The questionnaire was supplemented by 18 interviews with criminal justice and industry personnel for more definitive information on diversion problems. Results of this survey are reported.

18K. Reactor Physics

AECL-6409 PC **A03**/MF **A01**
Atomic Energy of Canada Ltd., Chalk River (Ontario). Chalk River Nuclear Labs.
NRU Analysis Support Experiments Performed in ZED-2. Description of Experiments, and Results; Part 1.
R. E. Kay. Jun 79, 45p
U.S. Sales Only.

Experiments have been performed in the ZED-2 critical facility which are representative, from a calculational point of view, of irradiation experiments performed in loops of the NRU research reactor. The objective was to provide detailed reactor physics data to check methods of calculation. Using a simulated NRU lattice in ZED-2 and a simulated NRU loop site, the following studies were made: reactivity effects associated with the loop site and its contents, as measured by changes in critical height; macroscopic flux perturbation effects on the surrounding lattice due to the presence of the loop site and its contents; and detailed reaction rate measurements within and about the loop site and its contents. (Atomindex citation 11:528757)

IAE-3110 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Atomnoi Energii.
On-Line System for Input Information Preparation for the BIPR and KR Programs. TANYA Program.
E. A. Zholkevich. 1979, 10p
In Russian.
U.S. Sales Only.

On-line system for input information preparation for the BIPR and KR programs, which consists of two stages, is described. At the first stage neutron-physical characteristics of homogeneous lattices are recorded on magnetic tape, which is carried out using by means of the edited UNIPA SOS program. Read-out of mass numbers, recorded on magnetic tape, their processing and obtaining of input information for the BIPR and KR programs take place at the second stage. All this is carried out using with the aid of the "TANYA" program. The on-line system of input information preparation is written on FORTRAN for the BESM-6 computer. Calculation results on the "TANYA" program for six states of the VVER-440 reactor cassettes are presented. (Atomindex citation 11:523515)

IAE-3118 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Atomnoi Energii.
GABI Program for Two-Dimensional Calculation of a Nuclear Reactor by the Galerkin Method.
G. I. Biryuk, and E. S. Glushkov. 1979, 15p
In Russian.
U.S. Sales Only.

The GABI program for two-dimensional calculation of a nuclear reactor by the Galerkin method is intended for calculation of the reactor in the r,z-geometry using the APAMAKO-F machine library of nuclear data. Using the given dimensions and zone composition the GABI program receives small-group microconstants (from 2 to 4) by averaging

the 26-group system obtained in the APAMAKO-F. The two-dimensional calculation of the reactor by the Galerkin method is carried out with these small-group microconstants. Ksub(ef), flows, neutron sources, heat-evolution distribution, reproduction coefficient, integrals of fission and absorption by zones both integrally and by elements are calculated in the program. The program is written in the FORTRAN language conformably to the BESM-6 computer. (Atomindex citation 11:523507)

ITEF-84(1979) PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Teoreticheskoi i Eksperimental'noi Fiziki.
Calculation of Axial Xenon Oscillations on Control by Minimum Square Diviation. ANNA Program.
A. M. Afanas'ev. 1979, 15p
In Russian.
U.S. Sales Only.

A scheme of constructing the solution of the xenon problem realized in the Anna program witten in the FORTRAN language for BESM-6 is presented. The Anna program permits to study the stability "in small" of stationary regime of reactor operation with regard for axial xenon oscillations in the presence of regulating system, providing in the places of transducers location the minimum of square deviation of a neutron field from its stationary values. The Anna program together with the LIBRARY-1 occupies approximately 42000 cells of the BESM-6 internal storage. Time, which is taken for solving a typical problem together with the printing of counting results in the form of tables and diagrams, is equal to 1.5-2min. approximately. (Atomindex citation 11:523502)

JAERI-M-8247 PC **A05**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Two-Dimensional Sensitivity Calculation Code: SENSETWO.
M. Yamauchi, M. Nakayama, K. Minami, Y. Seki, and H. Iida. May 79, 89p
In Japanese.
U.S. Sales Only.

A SENSETWO code for the calculation of cross section sensitivities with a two-dimensional model has been developed, on the basis of first order perturbation theory. It uses forward neutron and/or gamma-ray fluxes and adjoint fluxes obtained by two-dimensional discrete ordinates code TWOTRAN-II. The data and informations of cross sections, geometry, nuclide density, response functions, etc. are transmitted to SENSETWO by the dump magnetic tape made in TWOTRAN calculations. The required input for SENSETWO calculations is thus very simple. The SENSETWO yields as printed output the cross section sensitivities for each coarse mesh zone and for each energy group, as well as the plotted output of sensitivity profiles specified by the input. A special feature of the code is that it also calculates the reaction rate with the response function used as the adjoint source in TWOTRAN adjoint calculation and the calculated forward flux from the TWOTRAN forward calculation. (Atomindex citation 11:518691)

JAERI-M-8292 PC **A05**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
SCOTCH: A Program for Solution of the One-Dimensional, Two-Group, Space-Time Neutron Diffusion Equations with Temperature Feedback of Multi-Channel Fluid Dynamics for HTGR Cores.
M. Ezaki, S. Mitake, and T. Ozawa. Jun 79, 80p
In Japanese.
U.S. Sales Only.

The SCOTCH program solves the one-dimensional (R or Z), two-group reactor kinetics equations with multi-channel temperature transients and fluid dynamics. Sub-program SCOTCH-RX simulates the space-time neutron diffusion in radial direction, and sub-program SCOTCH-AX simulates the same in axial direction. The program has about 8,000 steps of FORTRAN statement and requires about 102 kilo-words of computer memory. (Atomindex citation 11:518687)

18L. Reactors (Power)

CEA-CONF-4602 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Dept. de Technologie.
Simulation of Load Following and Remote Control Operation in an Experimental Reactor.
J. Dodelier, P. Melin, J. Le Bars, and G. Lestiboudois. 1979, 7p
In French.
U.S. Sales Only.

With the prospect of an important increase in the part played by nuclear reactors in the generation of electric power in France, it seemed necessary to have light water nuclear reactor units take part in the load following (estimated generating programme adapted to the consumption estimate) and in remote control (regulation around a set figure of the power supplied according to demand). The present system of nuclear power station regulating does not allow this type of operation, so FRAMATOME have developed a new system for controlling the power of reactors called D.M.A. (increased manoeuvrability system). The feature of this system is the use of control clusters called 'gray rods' less absorbing than those employed at the present time. This permits rapid changes in the power supplied by the core without this causing local peaks that are too important. Nevertheless, very frequent variations in power result in fuel calls that are far more severe than in the case of basic power station working. It was therefore deemed necessary to carry out, in addition to an analytical approach to the phenomena, a simulation of a load following and remote control operation in a pressure water experimental reactor, doing this on a large number of pencils in order to assess the statistical effect. (Atomindex citation 11:514322)

19. ORDNANCE

19A. Ammunition, Explosives, and Pyrotechnics

AD-A091 281/6 PC **A03**/MF **A01**
Naval Weapons Support Center, Crane, IN.
NAVAIR-Sponsored Aerosol Research at NAVWPNSUPPCEN, Crane - FY 79.
Final rept. 1 Oct 78-30 Sep 79,
Carl E. Dinerman. 22 Sep 80, 49p Rept no. NWSC/CR/RDTR-131

This report discusses aerosol infrared extinction measuremenis done by Naval Weapons Support Center (NAVWPNSUPPCEN) Crane for the Naval Air Systems Command (AIR-310C) during FY 79. The purpose is to form the technological basis for development of new infrared screening aerosols with some emphasis on extinction at 10.6 micrometers. Subjects covered include: (1) the completion and checkout of an aerosol dry powder disseminator for laboratory use; (2) 10.6 micrometer transmittance measurements on boron carbide (B4C) powder; (3) similar measurements on silicon carbide (SiC) powder; (4) attempts to prepare large quantities of <1 micrometer diameter olivine powder; (5) initial attempts to make olivine smoke by pyrotechnic means; and (6) progress toward modification and renovation of an existing cloud chamber to make a large aerosol chamber.

AD-B017 905/1 PC **A07**/MF **A01**
California Research and Technology, Inc., Woodland Hills.
DICE-FAE Analysis of Fuel Dispersal and Detonation from a Fuel-Air-Explosive Device.
Final rept. 25 Oct 75-25 Feb 76,
Martin Rosenblatt, Gordon E. Eggum, and Kenneth N. Kreyenhagen. Mar 76, 143p CRT-5080-1, AFATL-TR-76-33
Contract F08635-76-C-0082
Distribution limitation now removed.

Using the DICE-FAE code, a numerical solution was generated of both the dispersal and detonation phases for a BLU-73 liquid Fuel-Air-Explosive device. DICE-FAE is a two-dimensional, implicit, Eulerian, finite difference code which treats fuel-air mixtures, fuel droplet break-up, fuel phase changes, and fuel-air detonation dynamics. The fuel droplets flow through the air and interact with the air through drag and heat exchange mechanisms. The cloud dispersal analysis started with initial conditions representing the fuel mass and burster products just after canister break-up. The FAE detonation analysis commenced with the calculated dispersed cloud fuel-air characteristics and with second event initiation by a centrally-located explosive charge. Detailed comparisons from the DICE-FAE results and experimental data have not been completed, but the final calculated cloud dimensions and peak detonation pressures appear reasonable. The computational results also provide a detailed prediction in terms of space and time of the fuel concentrations during the dispersal phase and of the pressures and temperatures during the detonation phase. (Author)

AD-307 031 MF **A01**
Aberdeen Proving Ground, MD.
Production Engineering Tests of Cartridge Heat, 90-mm, T300E54
J.GARY NELSON. Apr 59, 10p Rept no. mr194
Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche.

No abstract available.

AD-307 821 MF **A01**
Aberdeen Proving Ground, MD.
Effectiveness of Antitank Projectiles Against Tanks and Armor-Protected Diesel Fuel
G.W. SKINNER. May 59, 10p
Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche.

No abstract available.

AD-308 176 MF **A01**
Aberdeen Proving Ground, MD.
Test of Grenade, Rifle, Heat, M31E1 with T1022E2 Fuze
RUSSELL W. GROSS. May 59, 10p
Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche.

No abstract available.

AD-309 418 MF **A01**
Aberdeen Proving Ground, MD.
Performance of Spaced Armor when Attacked by the M344 Heat Projectile
D.M. KEITHLEY. Jul 59, 10p
Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche.

No abstract available.

AD-309 888 MF **A01**
Aberdeen Proving Ground, MD.
Test of Shell, Hep, T294E3 for 90-mm Rifle, T149
LEWIS R. LABUWI. Aug 59, 10p
Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche.

No abstract available.

AD-312 885 MF **A01**
Aberdeen Proving Ground, MD.
Fragmentation of Shell, 175MM, T203E3, 75/25 Octol-Loaded
M.S. RAABE. Oct 59, 10p
Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche.

No abstract available.

AD-312 886 MF **A01**
Aberdeen Proving Ground, MD.
Relative Effectiveness of TNT, Composition B, and H6 as Mine Filiers
ORION L. ROGERS. Oct 59, 10p
Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche.

No abstract available.

AD-313 057 MF **A01**
Aberdeen Proving Ground, MD.
Development of Cartridge, Heat, 105-mm, T384, for 105-mm Gun, T254
J.C. JR. SLEEPER. Oct 59, 10p
Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche.

No abstract available.

AD-313 080 MF **A01**
Aberdeen Proving Ground, MD.
Test of Cartridge, 105-mm, Apds, T382
R.H. ALLEN. Oct 59, 10p
Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche.

No abstract available.

AD-313 720 MF **A01**
Aberdeen Proving Ground, MD.
Final Engineering Test of Shell, Heat, 120-mm T153e13c for Gun, 120-mm, T123 Series
B.E. CALLIS. Nov 59, 10p
Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche.

No abstract available.

AD-313 953 MF **A01**
Aberdeen Proving Ground, MD.
Summer Desert Test, 1959, Yuma Test Station, Yuma, Arizona, of Rifle, 90MM, M.a.W., T219E4 (M67) Weapon System
G.T. WATSON. Nov 59, 10p
Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche.

No abstract available.

AD-366 242 PC **A03**/MF **A01**
Development and Proof Services, Aberdeen Proving Ground, MD.
The Incendiary Effectiveness of Hei Fillers in 20MM Projectiles,
Arthur Pillersdorf. Mar 56, 31p Rept no. 7
Distribution limitation now removed.

The major performance feature of interest in these tests, however, is the ability of the projectile to produce fuel fires in an aircraft under varying conditions of attack. An important characteristics of incendiary projectiles, is the maximum distance from projectile impact to an aircraft fuel cell wall, both laterally and along the profectile trajectory, at which a fuel fire can be obtained. Considerable, but incomplete, data had been obtained prior to the firings described in this report. The general expectations for the two types of targets used are substantiated in that: (1) when the trajectory of the projectile is perpendicular to the fuel cell wall (B-2 mockup target), higher percentages of incendiary mix generally increase the incendiary effectiveness of 20mm rounds; (2) when the trajectory is parallel to the fuel cell wall (Miss-Distance target), higher percentages of incendiary mix decrease the maximum distance at which fuel fires can be caused. The addition of two grams of 20 - 60 mesh, Tyler screen, in the base of the T282E1 projectile did not enhance the incendiary performance of this round. The modification of the T216E1 utilizing a steel slug in the shell cavity has promise for increased ammunition effectiveness. (Author)

AD-370 528 PC **A99**/MF **A01**
Development and Proof Services, Aberdeen Proving Ground, MD.
Shell, He, 175MM, T203E3.
1957, 754p Rept no. Firing Record-B-14105
Distribution limitation now removed.

Tests were performed to determine and compare the fragmentation characteristics of Shell, 175mm, T203E3 when loaded with Composition B or TNT. (Author)

AD-376 761 PC **A09**/MF **A01**
Development and Proof Services, Aberdeen Proving Ground, MD.
Data on the Fragmentation Characteristics of Shell, 81MM, M362 or T28E12 and a Variety of 81MM Modified Test Shell.
Rept for 22 Mar-1 Jul 57.
1 Jul 57, 191p Rept no. Firing Record-B-14133
Distribution limitation now removed.

No abstract available.

LA-8332 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Thermal Response of Spherical Explosive Charges Subjected to External Heating.
D. L. Jaeger. Aug 80, 11p
Contract W-7405-ENG-36

A series of one-dimensional heating experiments was performed with selected high explosives (HEs) in unconfined spherical geometries. The purpose of the program was to observe experimentally the thermal behavior of HE specimens near their ignition temperature and also to examine the accuracy with which the Arrenius kinetics models can simulate the ignition process. All test samples were instrumented with thermocouples and the time-temperature data were recorded on a flexible disk. Comparisons between analytical predictions and test data show that (1) the explosives go through a solid-state induction process before the Arrhenius models describe their behavior effectively, (2) the explosives have a memory of the induction process, and (3) the Arrhenius model can accurately predict the critical temperature but not necessarily the time to ignition. (ERA citation 05:037134)

MHSMP-80-50 PC **A02**/MF **A01**
Mason and Hanger-Silas Mason Co., Inc., Amarillo, TX.
Effects of Diameter and Temperature on XTX-8004 Detonation Velocity.
C. A. Campos. Oct 80, 10p
Contract AC04-76DP00487

This study was performed to determine the dependence of XTX-8004 steady detonation velocity on charge diameter and temperature. The tests were performed for four different diameters at three temperatures using a standard 4-track detonation velocity block and corresponding printed circuit ionization switch plate. The explosive was loaded in the detonation velocity block to a nominal density of 1.553 g/cc. Measurements obtained from two samples per temperature indicate the critical diameter is less than 0.178 cm. A relationship between detonation velocity and density due to temperature was established using experimental measurements. (ERA citation 05:037135)

N81-10202/2 PC **A02**/MF **A01**
Societe Nationale Industrielle Aerospatiale, Les Mureaux (France).
Actual and Predicted Reliability in Aerospace Pyrotechnics Fiabilite Previsionnelle et Experimentale en Pyrotechnie Spatiale.
C. Lemay. 1979, 7p SNIAS-792-422-104
Text in French. Presented at Congr. On Explosifs et Pyrotech.: Appl. Spatiales, Toulouse, 22-25 Oct. 1979.

The characteristics of pyrotechnic devices and the conditions under which they are used in space are presented. The theoretical approach to reliability analysis is outlined and the difficulties of using such analyses presented. Statistical applications of test results and the limits of their validity are mentioned.

PB81-118309 PC **A06**/MF **A01**
Department of the Interior, Washington, DC.
Explosion and Explosives.
c1980, 104p TT-78-52024
Trans. of Kogyo Kayaku Kyokaishi (Japan) v34 p1-98 1973. See also volume 33, PB80-196801. Sponsored in part by National Science Foundation, Washington, DC. Special Foreign Currency Science Information Program.

Contents: Breaking a reinforced concrete beam with high explosives; Friction sensitivity of high explosives tested on BAM friction apparatus; Thermal reactivities of nitro compounds I. Decomposition of TNT; Blasting by the low detonation pressure explosives; A model for the initiation of explosives--high and low velocity detonation; Gap test of explosives for underwater blasting; A consideration of sympathetic detonation of gelating dynamite by shock waves through granite; Thermal reactivities of nitro compounds II. Decomposition of tetryl; The crosslinking reaction of carboxyl-terminated polybutadiene with epoxy compound.

19C. Combat Vehicles

AD-A091 059/6 PC **A06**/MF **A01**
Naval Postgraduate School, Monterey, CA.
A Parametric Analysis of the Techniques Used for the Recovery and Evacuation of Battle Damaged Tracked Vehicles.
Master's thesis,
John Frederick Affeldt. Jun 80, 118p

The parameters involved in the recovery, evacuation and subsequent return of combat damaged tracked vehicles are identified and discussed. A parametric model for detailed analysis of the processes involved is developed and used to investigate five test cases. Quantitative decision rules for modelling recovery and evacuation are discussed. (Author)

19D. Explosions, Ballistics, and Armor

AD-A091 206/3 PC **A03**/MF **A01**
Directorate of Aerospace Studies Kirtland AFB NM
The Probability of Hit of the Antiarmor Cluster Munition.
Final rept.,
Courtlandt L. Bohn. Jun 79, 40p Rept no. DAS-WP-79-4

One weapon system concept proposed as a Wide-Area Antiarmor Munition (WAAM) is the Antiarmor Cluster Munition (ACM). The ACM consists of a clustered bomb unit (CBU) dropped to the battlefield by parachute; during its descent the system behaves like a damped spherical pendulum. At a certain preprogrammed height (nominally 1m) the CBU detonates, sending forth discrete warheads at hypervelocities. This method of delivery gives rise to certain ramifications regarding the probability that a warhead will hit a target. Specifically, the pendular motion acts to degrade the probability of hit pH. This paper presents a formal derivation of pH with regard to hitting a solitary target; the treatment entails coupling the physics of the pendulum to geometrical considerations. It also presents numerical examples which show pH is quite sensitive to the (ensemble-averaged) maximum amplitude of the pendular motion. (Author)

19E. Fire Control and Bombing Systems

AD-B023 971/5 PC **A06**/MF **A01**
Air Force Armament Lab., Eglin AFB, FL.
Air-to-Ground Gunnery Simulation Computer Program - P0655.
Final rept. Nov 75-Jul 76,
Robert W. Merritt. Oct 76, 117p Rept no. AFATL-TR-76-115
Distribution limitation now removed.

This gun simulation program is a research contribution which employs a Monte Carlo technique to determine the probability of destroying a rectangular target with air-to-ground gunnery. The effect of correlation of successive aim points is considered and bivariate normal aiming error and ballistic dispersion are assumed. The mathematical derivation, FORTRAN program listing, variable list, flow chart, sample deck set-ups, and output results are included. (Author)

AD-308 515 MF **A01**
Aberdeen Proving Ground, MD.
Final Engineering Evaluation Test of Cluster Demolition Bomb, T36
J.A. GIBBONS. May 59, 10p PA-TPR-TF-113

Distribution limitation now removed. NOTE: Only 35mm microfilm is available. No microfiche.

No abstract available.

19F. Guns

AD-A090 830/1 PC **A02**/MF **A01**
Office of the Comptroller of the Army, Washington, DC. Directorate of Cost Analysis.
Cost Estimating Relationship for Theoretical First Unit Cost for Medium Bore Guns (10 - 40mm),
Gene R. Farmelo. Dec 76, 12p Rept no. DCA-R-44

This report contains the results of an effort to collect data and develop a Cost Estimating Relationship (CER) to be used for predicting production costs for medium bore guns. The CER is based on two independent variables; size of the bore and number of barrels. Statistical attributes of the CER include a multiple correlation coefficient of 0.9969 and an index of determination of 0.9939. The data base contains seven data points representing guns with bore sizes that range from 7.62 to 40 millimeters with one to six barrels. The costs have been normalized to FY 77 dollars. (Author)

AD-A090 952/3 PC **A06**/MF **A01**
Arinc Research Corp., Annapolis, MD.
Technical and Management Support for the Gun Weapon System Replacement Program,
Nick Lakis. Aug 80, 101p Rept no. 1665-01-2254
Contract N00174-79-C-0340
See also AD-A056 935, AD-A061 631, and AD-A074 295.

During a 12 month period commencing on 14 August 1979, specific program areas of management responsibility were analyzed by ARINC Research Corporation to provide engineering and management support to NOSIH. This study presents the results of investigations into program areas that showed a high potential for (1) improvement to existing procedures and (2) coordination with the Destroyer Engineered Operating Cycle (DDEOC) Program and emergent Engineered Operating Cycle (EOC) programs. Specific areas addressed included GWSRP OrdAlt accomplishment, on-line terminal installation supporting the GWSRP Management Information System (MIS), GWSRP-cognizant lifting gear capabilities at existing waterfront industrial sites, DDEOC (and emergent EOC program) Class Maintenance Plan (CMP) refinement, coordination of scheduling requirement of GWSRP with DDEOC and emergent EOC programs, and continuing engineering support to GWSRP. The conclusions and recommendations will provide program managers with guidelines for the coordination of their respective maintenance management activities and improvement to their current procedures.

AD-B020 358/8 PC **A03**/MF **A01**
Ford Aerospace and Communications Corp., Newport Beach, CA. Aeronutronic Div.
Optimum Rifling for Plastic Bands.
Final rept. Apr-Oct 76,
Richard A. Harlow, and Richard C. Kimball. Dec 76, 27p AFATL-TR-76-152
Contract F08635-76-C-0204
Distribution limitation now removed.

A six-month program was conducted to more conclusively determine which rifling configuration is best suited for use with high velocity medium caliber projectiles with plastic rotating bands. The program consisted of fabricating a test barrel and plastic banded projectiles and conducting test firings on five different rifling designs at -65 F, ambient temperature, and +165 F using progressively narrower rotating bands. The results showed that a sawtooth configuration and a modified conventional 18-groove design were superior to the other conventional and modified conventional designs evaluated. (Author)

AD-B028 651/8 PC **A04**/MF **A01**
Ford Aerospace and Communications Corp., Newport Beach, CA. Aeronutronic Div.
GAU-8 30mm Gun Barrel Rifling Development.
Final rept. Jun 76-Mar 77,
Richard A. Harlow, and Donald P. Haas. Apr 77, 53p AFATL-TR-77-58
Contract F08635-76-C-0284
Distribution limitation now removed.

A 9-month program was conducted to develop improved 30mm GAU-8 rifling and deliver test barrels to the Air Force which incorporated the new rifling designs. Gain twist rifling was designed. Two rifling groove configurations, modified conventional and sawtooth, were designed based on thermal analysis, rotating band engraving considerations and FINE code analysis. Two 30mm GAU-8 barrels with modified conventional gain twist rifling and two barrels with sawtooth gain twist rifling were fabricated and delivered to the Air Force. (Author)

UCRL-84311 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Unsteady Boundary-Layer Flows in Combustion Environments.
S. W. Kang, and J. L. Levatin. 15 Aug 80, 10p
CONF-800956-1
Contract W-7405-ENG-48
17. JANNAF combustion meeting, Hampton, VA, USA, 22 Sep 1980.

Current progress is described in the calculation of nonsteady boundary layers connected with internal flows for the purpose of discovering the principal wall erosion mechanisms. A time-dependent system of equations describing the laminar and turbulent viscous layer is solved numerically by means of an alternating-direction-implicit (ADI) scheme for prescribed transient and streamwise-varying core flow conditions. Validity of the method is demonstrated by comparison of present results with those obtained by previous analyses. Earlier calculations of compressible turbulent flow cases showed that high heat fluxes at the wall due to turbulence and changing core conditions could bring about severe temperature rise at the wall. Present results indeed display a marked rise in wall temperature which may cause melting and ablation, and hence erosion of the surface. (ERA citation 05:037045)

20. PHYSICS

20A. Acoustics

AD-A090 871/5 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Effects of Temperature-Dependent Anisotropy in RAC Devices and a Cut of Quartz for a Temperature-Compensated RAC.
Journal article,
Daniel E. Oates, and Richard C. Williamson. 1979, 6p MS-5058, ESD-TR-80-39
Contract F19628-80-C-0002
Pub. in Ultrasonics Symposium Proceedings, p691-695 Sep 79.

No abstract available.

AD-A090 947/3 PC **A23**/MF **A01**
Rome Air Development Center, Griffiss AFB, NY.
Microwave Acoustics Handbook. Volume 3. Bulk Wave Velocities.
Rept. for Nov 71-Apr 80,
A. J. Slobodnik, Jr., R. T. Delmonico, and E. D. Conway. May 80, 533p Rept no. RADC-TR-80-188-VOL-3

Information useful of the design of acoustic delay lines, resonators, and other miniature, low cost, reliable devices for use in communications and electronic sensing is given in this report. Computations of bulk acoustic wave velocities, power flow angles, and coupling to electric fields are plotted for various orientations of the following single crystalline materials: Ba2NaNb5O15, Bi12GeO20, CdS, Diamond, Eu3Fe5O15, Gadolinium Gallium Garnet, GaAs, Germanium, InSb, InAs, Lead Molybdate, PbS, LiNbO3, LiTaO3, MgO, Quartz, Rutile, Sapphire, Silicon, Spinel, TeO2, YAG, YGaG, YIG, and ZnO. Particular cuts of interest, including cases for common metals, are then chosen for more detailed numerical calculations of mechanical and electrical parameters governing acoustic wave propagation in these media. A list of material constants is also included. (Author)

AD-A091 016/6 PC **A05**/MF **A01**
Wyle Labs El Segundo CA
Correction Procedures for Aircraft Noise Data. Volume III. Filter Effects.
Final rept.,
Louis C. Sutherland. Jul 80, 93p WR-79-9-VOL-3, FAA/EE-80-1-VOL-3
Contract DOT-FA78WA-4143
See also Volume 4, AD-A083 075.

A method has been developed to quantify errors in measurement, correction and extrapolation of aircraft noise data which are attributable to spectrum slope and nonideal filter transmission characteristics. The method's fundamental basis is an iterative calculation scheme which recovers an estimate of the true spectrum shape of a signal from its measured band levels. This 'true' spectrum can then be extrapolated to other distances or have frequency dependent corrections made to it on an exact basis without need for worry about filter or slope errors. The new spectrum may then be reintegrated to produce band levels suitable for input to EPNdB or PNL calculations. Applying this procedure to real flyover data and comparing the resultant values of EPNL with those using FAR Part 36 procedures showed only small differences usually. However, the technique provides a consistent method for the analysis of errors due to these sources and should be useful for estimating their magnitude in the future. (Author)

AD-A091 017/4 PC **A04**/MF **A01**
Wyle Labs El Segundo CA
Correction Procedures for Aircraft Noise Data. Volume V. Propeller Aircraft Noise.
Final rept.,
David Brown, and Louis C. Sutherland. Jul 80, 59p WR-79-9-VOL-5, FAA/EE-80-1-VOL-5
Contract DOT-FA78WA-4143
See also Volume 3, AD-A091 016.

This report examines three particular problem areas associated with the measurement of noise levels of propeller-driven small airplanes required to comply with FAR Part 36, Appendix F. These problems are directly related to effects of atmospheric conditions on (1) the performance capabilities of an airplane when tested at various barometric pressures and altitude densities; (2) the noise signature generated at such conditions; and (3) the propagation of sound from the airplane to the measuring station. The first two of these have been addressed by deriving potential correction procedures which could be applied to noise levels obtained by tests not in strict compliance with Appendix F. These corrections are based on aircraft operations conducted within a specific margin of power setting. The corresponding measured noise levels are subsequently corrected for variation of propeller tip speed, forward velocity and barometric pressure relative to predetermined reference conditions. The third effect, that of sound propagation, si examined by applying SAE ARP 866A to a typical propeller airplane noise spectrum and demonstrating the range of A-weight noise levels that would result within a range of ambient conditions. (Author)

AD-A091 024/0 PC **A06**/MF **A01**
Underwater Systems, Inc., Silver Spring, MD.
Sound Propagation South of Martha's Vineyard.
Final rept.,
Richard J. Hecht. 30 Jun 80, 115p
Contract N00014-79-C-0466

An experiment was performed south of Martha's Vineyard, Massachusetts, on the Long Island plat-

form using an embedded triaxial geophone and a colocated hydrophone as a receiver. The data shows low propagation loss even with a strong negative sound velocity gradient in the water. The signals from the embedded vertical geophone show 10 to 12 dB less apparent propagation loss than the signals from the hydrophone in the 30 to 200 Hz frequency band. At lower frequencies, signals from all four sensors were similar. (Author)

AD-A091 210/5 PC **A04**/MF **A01**
SACLANT ASW Research Centre, La Spezia (Italy).
Bottom-Interating Ocean Acoustics. Proceedings of a Conference held at SACLANTCEN on 9-13 June 1980.
Conference proceedings,
William A. Kuperman, and Finn B. Jensen. 15 Jul 80, 65p Rept no. SACLANTCEN-CP-27

In recent years the SACLANT ASW Research Centre has been conducting a research programme concerned with various aspects of bottom-interacting ocean acoustics. This conference represented an attempt to assemble as much state-of-the-art information as possible in order to further stimulate this research field, both at the Centre and elsewhere. To accomplish this, papers were called in the following areas: Coastal-water acoustic, Low-frequency deep-water acoustics involving bottom interaction, Acoustic properties of marine sediments, Ocean seismic studies as related to ocean acoustics, and Signal-processing techniques that include the effects of bottom interaction. After receiving the abstracts presented on the following pages, the papers were re-categorized as follows: Geoacoustic properties of marine sediments, Bottom loss: reflection and refraction, Bottom-interface and seismic-wave propagation, Acoustic modelling, Sound propagation: techniques and experiment vs theory, and Fluctuations, coherence and signal processing. These categories seem to represent the basic breakdown by field of present-day research in this area. Though each paper was classified into one of these categories for conference purposes, many papers overlapped two or three areas. Not only were scientific results communicated, but the latest techniques and the state-of-the-art tools of the trade (existing and in development) were also presented.

AD-A091 233/7 PC **A02**/MF **A01**
Naval Research Lab., Washington, DC.
Contribution of Antisymmetric and Symmetric Waves to the Reflection of Sound in a Fluid by a Thick, Homogeneous Plate.
Memorandum rept.,
Pieter S. Dubbelday. 23 Oct 80, 15p Rept no. NRL-MR-4312

Thick-plate theory, for flexural and extensional waves in plates is applied to the analysis of the reflection of sound from an isotropic, homogeneous plate. An explicit expression is given for the reflection coefficient when both antisymmetric and symmetric waves are contributing to the reflection mechanism. This is compared with the case in which these types of waves are assumed to occur separately. It is shown that the relative strength of the two wave types, as measured by the cross-sectional average of the square of the particle displacement, is strongly dependent on coincidence between the trace speed of the incident wave in the fluid and the free wave speed of the pertinent wave type in the plate. Away from resonances, the energy densities of the two wave types appear to be about equal. This leads to the conclusion that the contribution of symmetric waves to the reflection of sound by a plate should be taken into account. (Author)

AD-A091 338/4 Not available NTIS
SACLANT ASW Research Centre, La Spezia (Italy).
Sound Propagation in a Wedge-Shaped Ocean with a Penetrable Bottom,
Finn B. Jensen, and William A. Kuperman. 16 Oct 79, 7p Rept no. SACLANTCEN-SR-38
Availability: Pub. in Jnl. of the Acoustics Society of America, v67 n5 p1564-1566 May 80 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A091 375/6 PC **A02**/MF **A01**
SACLANT ASW Research Centre, La Spezia (Italy).
A Simple Formula to Calculate Shallow-Water Transmission Loss by Means of a Least-Squares Surface Fit Technique.
Memorandum rept.,
Ole F. Hastrup, and Tuncay Akal. 1 Sep 80, 15p Rept no. SACLANTCEN-SM-139

A semi-empirical formula TL = 15 log R + (A + B(log f) + C(log f) sq) R + D (in dB) is proposed to express sound transmission loss in shallow water as a function of range and frequency. The four coefficients A, B, C and D are determined from either experimental or model data by the use of a least-squares surface fit and the formula usually gives a standard derivation of the order of a few dB. The formula can be used for studying system performances, sonar range predictions, and as a compact data storage. (Author)

AD-A091 376/4 PC **A02**/MF **A01**
SACLANT ASW Research Centre, La Spezia (Italy).
The SACLANTCEN Shallow-Water Transmission-Loss Data-Filing System.
Memorandum rept.,
Ole F. Hastrup, Tuncay Akal, and Arturo Parisotto. 1 Oct 80, 17p Rept no. SACLANTCEN-SM-141

A computerized data-filing system has been developed to store measured transmission losses in a matrix as functions of range and frequency, together with the information giving the basic characteristics of the environment. The main advantages of this system are its easy access and the possibilities for extracting the information in different formats, depending on the requirements. (Author)

N81-10807/8 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
New Interpretations of Shock-Associated Noise with and Without Screech.
U. Vonglahn. 21 Nov 80, 25p NASA-TM-81590, E-569
To Be Presented at the 100TH Meeting of the Asa, Los Angeles, 17-21 Nov. 1980.

Anomalous trends in present convergent nozzle (Mach 1) shock associated noise analyses and predictions, with particular emphasis on the roles of screech and jet temperature, are discussed. Experimentally measured values of shock associated noise are used to reassess data trends, including both frequency and sound pressure level. The data used includes model-scale nozzles, varying in nominal diameter from 5 cm to 13 cm, and full scale engine nozzles up to 48 cm. All data were obtained at static conditions. From this reassessment of the measured data, new empirical methods for the prediction of shock associated noise are developed. Separate procedures are presented for screech free and screech contaminated shock associated noise. In the present approach, shock associated noise spectra are developed from considerations that include the peak sound pressure level and its frequency, the low frequency sound pressure level slope, and the high frequency sound pressure level slope or roll-off; the latter is shown to vary with directivity angle.

N81-10810/2 PC **A09**/MF **A01**
Centre Technique des Industries Mecaniques, Senlis (France).
Acoustic Radiation Calculations Calcul du Rayonnement Acoustique.
Ph.D Thesis Final Report.
N. Sayhi. 30 Jan 80, 193p CETIM-1-1H-13-0
Text in French.

The acoustic field generated by a vibrating body immersed in an infinite fluid medium was studied. Integral formulations are expressed in discrete form. Near, mean distance, and far field characteristics are then obtained from the linear numerical system subsequently deduced. The validity of the method is demonstrated from the results of numerical tests carried out on classical examples such as (spheres and cylinders).

20B. Crystallography

AD-A090 893/9 Not available NTIS
Princeton Univ., NJ. Dept. of Electrical Engineering and Computer Science.
Comparison of LEED and Auger Data from Cleaved and Sputtered-Annealed InP(110) Surfaces,
J. C. Tsang, A. Kahn, and P. Mark. 4 Feb 80, 10p ARO-14710.16-EL
Contract N00014-75-C-0394, Grant DAAG29-77-G-0116
Availability: Pub. in Surface Science, v97 p119-127 1980 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A090 909/3 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Solid-Phase Growth of Large Aligned Grains During Scanned Laser Crystallization of Amorphous Ge Films on Fused Silica.
Journal article,
John C. C. Fan, Herbert J. Zeiger, Ronald P. Gale, and Ralph L. Chapman. 24 Aug 79, 5p JA-5014, ESD-TR-80-60
Contract F19628-80-C-0002
Pub. in Applied Physics Letters, v36 n2 p158-161, 15 Jan 80.

No abstract available.

AD-A090 988/7 PC **A02**/MF **A01**
Varian Associates, Inc., Palo Alto, CA. Solid State Lab.
Effect of Accelerated Growth Rate (1-5 micrometers/h) on Molecular Beam Epitaxial GaAs Using Si as a Dopant,
Young G. Chai. 24 Apr 80, 5p AFOSR-TR-80-1024
Contract F49620-80-C-0011
Pub. in Applied Physics Letters, v37 n4 p379-382, 15 Aug 80.

No abstract available.

AD-A091 203/0 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Research Lab. of Electronics.
Microstructure Fabrication Research,
Krikor A. Bezdjian, Stephane S. Dana, John Melngailis, and Henry I. Smith. 1979, 6p
Contract N00014-79-C-0908
Pub. in Research Lab. of Electronics Progress Report No. 122, Section 19, p89-91 Jan 80.

No abstract available.

AD-A091 342/6 PC **A03**/MF **A01**
University of Southern California, Los Angeles. Electronic Sciences Lab.
Growth and Characterization of Epitaxial Piezoelectric and Semiconductor Films.
Final rept. 1 Jun 79-31 Jul 80,
K. M. Lakin, and S. K. Tiku. Jul 80, 29p AFOSR-TR-80-1073
Contract F49620-79-C-0138

This report contains details of the research work carried out on a one-year project on the growth and characterization of ZnO and AlN piezoelectric thin films. Material growth systems are reported for ZnO using the zinc vapor reaction with CO2, ZnCl2 with O2, and the latest metal-organic process. The growth of insulating ZnO has been achieved using lithium doping during film growth. Initial results are reported for a new AlN growth process that shows promise of overcoming some previous growth problems. (Author)

AD-A091 351/7 Not available NTIS
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Liquidus Isotherms, Solidus Lines and LPE Growth in the Te-Rich Corner of the Hg-Cd-Te System,
T. C. Harman. 12 Jun 80, 18p ARO-17077.1-P
Grant ARO-37-80
Availability: Pub. in Jnl. of Electronic Materials, v9 n6 p945-961 1980 (No copies furnished by DTIC/NTIS).

No abstract available.

IA-1352 PC **A07**/MF **A01**
Israel Atomic Energy Commission, Yavne. Soreq Nuclear Research Center.
Phase Equilibria and Crystal Growth in the Pb-Sn-Te System.
N. Tamari. Mar 79, 133p
In Hebrew.Thesis.
U.S. Sales Only.

A simple technique was developed for the growth of high-quality Pb/sub 1-x/Sn/sub x/Te crystals from the gas phase with a high yield. The various parameters which influence nucleation and growth, such as charge composition and treatment, critical undercooling and thermal conditions, growth rate and crystalline imperfections were studied. The optimal conditions were defined. The investigation of the carrier concentration of the crystals with respect to the growth conditions leads to a better understanding of the way this property is determined. It also permits growth of n-PbTe and p-PbTe crystals over a wide range of temperatures and compositions far beyond that mentioned in the literature. The carrier concentration measured in the epilayers (solidus curves) revealed one of the most troublesome problems in device manufacture: interdiffusion of native defects, which leads to junction migration and modification of the spectral response. It was found that by working in a narrow range of growth conditions it is possible to attain the required device performance when no dopants are used. (Atomindex citation 11:511814)

N81-10876/3 PC **A05**/MF **A01**
Allgemeine Elektricitaets-Gesellschaft AEG Telefunken, Heilbronn (Germany, F.R.).
Physical Analysis of Process-Induced Material Defects.
Final Report.
K. Graff. Dec 79, 87p BMFT-FB-T-79-79
In German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

The different types of impurities and defects observed in semiconductor materials are described. Methods used to detect these defects are summarized. Heavy metal impurity contents were determined after high temperature processing in various atmospheres and after silicon epitaxy. Pulled and floating zone silicon crystals were investigated after annealing, special attention is given to oxygen and carbon contents. Variations were observed in the lattice constants of silicon epitaxial layers. The results obtained with silicon after electron bombardment are presented. A method for detecting dislocations in GaP crystals is reported.

N81-10878/9 PC **A03**/MF **A01**
Consortium fuer Elektrochemische Industrie G.m.b.H., Munich (Germany, F.R.).
Preparation and Doping of Epitaxial Layers of Silicon Carbide.
Final Report.
H. Seiter. Dec 79, 44p BMFT-FB-T-79-125
In German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

Layers of silicon carbide were deposited from the vapor phase on a single crystal silicon substrate. The vapor phase consists of a mixture of SiCl4 or SiH4 with hydrocarbons and hydrogen. The doping level was raised to about 0.1 Ohm cm by the addition of PBr3 during the deposition. Addition of boron compounds, e.g., BC13 or B2H6 to the vapor phase did not result unambiguously in p-type material. Examination of the SiC layers by X-ray diffraction showed that it is possible to get epitaxial growth on the /111/ surface of Si. The layers were up to 5 microns thick. The epitaxial layers consist preferentially of the hexagonal SiC polytype. The photoluminescence spectral distribution of these SiC layers is similar to that of a single crystal of SiC, but the efficiency of the photoluminescence is relatively low.

SERI/PR-8031-1-T1 PC **A02**/MF **A01**
Stanford Univ., CA. Dept. of Materials Science and Engineering.
Photoelectronic Properties of Zinc Phosphide Crystals, Films and Heterojunctions. Quarterly Progress Report No. 5, April 1-June 30, 1980.
R. H. Bube. 1980, 12p
Contract AC02-77CH00178

Growth of Zn sub 3 P sub 2 crystals using a chemical transport method with iodine as the transport agent produced a successful growth run with greatly enhanced growth rate. Surprisingly, the electrical properties of the crystal appear to be unaffected by the iodine transport agent. This method is being explored as an alternative to thermal diffusion for doping of Zn sub 3 P sub 2 . Hall effect measurements have been made on several Zn sub 3 P sub 2 crystals as a function of temperature. Measured hole mobilities were between 10 and 20 cm exp 2 /V-sec. The mobility varies with temperature in the expected way for lattice scattering at higher temperatures and charged imperfection scattering at lower temperatures. n-CdO/p-Zn sub 3 P sub 2 junctions were prepared by rf sputtering of CdO on Zn sub 3 P sub 2 crystal substrates, both with and without previous etching of the surface. Poor dark diode and almost absent light response were measured. Thin films of Zn sub 3 P sub 2 grown by close-spaced vapor transport have a higher growth rate in H sub 2 than in Ar. Thermoelectric power measurements are being prepared to analyze the transport properties in these films. (ERA citation 05:036309)

20C. Electricity and Magnetism

DOE/ET/29197-8 PC **A02**/MF **A01**
Rensselaer Polytechnic Inst., Troy, NY. Center for Electric Power Engineering.
Fundamentals of Interruption in Vacuum. Eighth Progress Report.
A. N. Greenwood, and 30 May 80, 16p
Contract AS02-78ET29197

In analyzing the behavior of a vacuum arc during interruption , a mathematical model has been set up to describe the events occurring in the interelectrode gap during interruption. The reliability of the results obtained using such a model depends on the accuracy of the initial assumptions made in setting up the model equations. Previous results obtained from the model analysis were compared to experimental data and it was found that there was a discrepancy close to current zero. To improve our model results some of the original model assumptions have been reconsidered in order to make the model more closely represent the physical reality of a vacuum arc. (ERA citation 05:036637)

20D. Fluid Mechanics

AD-A090 829/3 PC **A06**/MF **A01**
Flow Research Co., Kent, WA.
Development of Finite-Volume Methods for Three-Dimensional Transonic Flows.
Flow research rept. on Phase 2,
John E. Mercer, Wen-Huei Jou, David A. Caughey, Antony Jameson, and David Nixon.
Aug 80, 110p Rept no. FLOW-RR-166
Contract N00014-78-C-0079

This report covers the Phase II progress in a two-phase effort to develop the full-potential finite-volume algorithm for transonic flow over wing-body configurations. The work included investigations of grid-generation schemes, extension of the wing-body code to more complex configurations, and the effects of vortex wake modeling. The wing-body code was used to analyze a computer-designed military aircraft wing which had been wind tunnel tested. Computed results agree quite well with the experimental data. A second test case was also run for a business jet aircraft. Unfortunately, experimental data for the test case were not available for comparison. (Author)

AD-A090 847/5 PC **A02**/MF **A01**
California Inst. of Tech., Pasadena. Graduate Aeronautical Labs.
The Plane Mixing Layer Flow Visualization Results and Three Dimensional Effects,
A. Roshko. 1980, 19p
Contract N00014-76-C-0260
Presented at the International Conference on the Role of Coherent Structures in Modelling Turbulence and Mixing, Madrid, Spain, 25-27 Jun 80.

The turbulent mixing layer between two streams of different velocities continues to play a central role in research aimed at improved understanding of turbulent shear flows in general. At present, not all researchers are in agreement as to what various experiments imply about the structure of mixing layers at high Reynolds number. The views which are held differ on the question as to how and to what extent three dimensionality develops in these flows and whether the characteristic spanwise organized large vortex structures (rollers) continue to be a dominant feature. The traditional view, as extended to the contemporary scene, is that ultimately (i.e., sufficiently far downstream or at sufficiently high Reynolds number) the flow will be completely disorganized. The view put forward by 'eddy chasers' is that such vortex structures are primary elements, characteristic of the underlying mean vorticity field, which is particularly simple for the mixing layer, and that, as long as the velocity difference is maintained, there is a mechanism to regenerate these primary structures by what, for convenience, may be called a Kelvin-Helmholtz instability. The heart of the controversy then is whether, or to what extent, secondary and higher instabilities will ultimately break down, completely disorganize or prevent formation of organized primary structures. In a plane mixing layer, the primary structures would, ideally, be two dimensional, containing the basic single component of vorticity while secondary and higher modes of instability would introduce three dimensionality and the other two components of vorticity into the flow. (Author)

AD-A090 955/6 PC **A04**/MF **A01**
Air Force Weapons Lab., Kirtland AFB, NM.
A Two-Dimensional Computation of Ribbed Pipe Flow.
Final rept.,
J. Douglas Beason, and C. E. Needham. Apr 80, 61p Rept no. AFWL-TR-79-65

The study of ribbed pipe flow is currently of great interest to several diverse groups. Unlike smooth pipe flow which has been studied in great depth, ribbed pipe flow is relatively new to experimental, analytic and computational research efforts. A recent computer simulation of ribbed pipe flow was made by the Air Force Weapons Laboratory using a two-dimensional, Eulerian finite difference hydrodynamic computer code. Two separate experiments were modeled using a course (0.13 cm x 0.78 cm) and a very fine (0.065 cm x 0.065 cm) zone calculation. The two-dimensional calculations used one-dimensional input, obtained from a highly successful earlier effort to model smooth pipe flow. The one-dimensional input closely matched the smooth true calibration performed prior to the ribbed pipe experiment. Computational flow patterns and pressure waveforms were compared to pictures of holographs of the experimental flow and also to pressure waveforms obtained from the various gauges. Individual shocks and vortices could be matched very well, as well as the pressure waveforms. (Author)

AD-A090 999/4 Not available NTIS
Minnesota Univ., Minneapolis. Dept. of Aerospace Engineering and Mechanics.
Some Inequalities in the Theory of Simple Fluids,
D. D. Joseph. 17 Mar 80, 3p ARO-16036.9-E
Contract DAAG29-79-C-0038
Availability: Pub. in Rheologica Acta, v19 n3 p389-390 1980 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A091 010/9 PC **A99**/MF **A01**
Hebrew Univ Jerusalem (Israel)
Proceedings of the International Symposium on Shock Tubes and Waves (12th) Held at Jerusalem on 16-19 July 1979.
Final rept. 30 Sep 78-31 Dec 79,
Assa Lifshitz, and Josef Rom. Feb 80, 746p
AFOSR-TR-80-1141
Grant AFOSR-78-3679

The papers in the volume are divided into three parts and arranged according to their presentation

at the symposium. The first part contains the plenary lectures (sessions A) including the Paul Vieille (1A) and the Otto Laporte (7A) memorial lectures. The second part contains all the papers presented in sessions B and deals with the general field of shock waves and gasdynamics. Topics covered in these sessions included shock tube facilities, shock flow computations, ionized gases in shock waves, instrumentation and experimental techniques, shock reflections and interactions, shock waves and jets, and plasma flow. The papers in the third part are those presented in sessions C. They describe work related to chemical and physical processes in shock waves. Topics covered were chemical rate processes, detonations, diagnostics and experimental methods, lasers and energy and waves.

AD-A091 050/5 PC **A02**/MF **A01**
Pennsylvania State Univ., State College. Applied Research Lab.
The Use of Fluorescent Mini-Tufts for Hydrodynamic Flow Visualization.
Technical memo.,
A. L. Treaster, and D. R. Stinebring. 29 Jan 80, 13p Rept no. ARL/PSU, TM-80-07
Contract N00024-79-C-6043

A new flow visualization technique was demonstrated in the 12-inch (0.305 m) and 48-inch (1.22 m) diameter water tunnels of the Applied Research Laboratory at The Pennsylvania State University (ARL/PSU). The technique features the application of large numbers of extremely fine nylon mono-filament fiber tufts to a model's surface. The fibers are treated with a fluorescent dye and rendered visible by ultraviolet light. (Author)

AD-A091 204/8 PC **A02**/MF **A01**
Arnold Engineering Development Center, Arnold AFS, TN.
Analytical Approximation of Two-Dimensional Separated Turbulent Boundary-Layer Velocity Profiles.
Final rept. 1 Oct 78-15 Apr 79,
T. W. Swafford. Oct 80, 25p Rept no. AEDC-TR-79-99
Prepared in cooperation with ARO, Inc., Tullahoma, TN.

A single analytical expression is proposed to describe the velocity distribution in a two-dimensional, separated, turbulent boundary layer on smooth, impermeable, adiabatic walls over the domain 0 less than or = to y less than infinity. The expression is an extension of one previously derived for attached flow which depends upon local values of skin friction, shape factor, and Reynolds number based on momentum thickness. Boundary-layer shape factor and local skin friction correlations applicable to separated flows are derived from fitting the proposed analytical expression for separated velocity profiles to available experimental data. These correlations are then available for analytically describing separated velocity profiles without further fitting.

AD-A091 234/5 PC **A02**/MF **A01**
Naval Research Lab., Washington, DC.
Interfacial Conditions of a Cylindrical Vortex Sheet.
Memorandum rept.,
Y. T. Fung. 8 Oct 80, 21p Rept no. NRL-MR-4324

Interfacial conditions for a cylindrical vortex sheet or a cylindrical fluid layer with radius-dependent density, velocity and magnetic fields are derived for isentrioptic compressible swirling flows subjected to arbitrary disturbances. Surface tension in included for possible immiscible fluids. These conditions are valid for both spatially and temporally growing waves and for flow profiles with or without discontinuities. The deformation of the sheet or layer affects the flow in two ways: perturbing the total presure field and disturbing the centrifugal force field created by the azimuthal components of the velocity and the magnetic flux. It is shown, through the derivations of the interfacial conditions, the the Rayleigh-Synge and the Alfven discriminant are in fact a differential representation of the centrifugal force field. Both discriminants play a crucial role in the stability characteristics of hydromagnetic swirling flows. As supported by a previously proposed mechanisms, instabilities of such flows are both of centrifugal and of shear origin, the generalized Michael condition being a criterion for centrifugal stability. Centrifugal forces and velocity gradients affect flow characteristics through their interaction with the Lagrangain displacement. For centrifugally stable profiles, unstable waves with large numbers may be stabilized by centrifugal effects. This suggests a mechanism for the dilemma that the most unstable waves for flows of vortex sheet types correspond to the smallest-scale disturbances that are not observed in experiments. (Author)

AD-A091 235/2 PC **A04**/MF **A01**
Naval Surface Weapons Center, Dahlgron, VA.
Optimal Bodies for Minimum Total Drag at Supersonic Speeds.
Final rept.,
Nicholas J. Moga. May 80, 57p Rept no. NSWC/TR-80-208

Two new methods were developed for predicting projectile shape which yield minimum total drag at supersonic speeds. The first technique is an Eulerian scheme that uses modified Newtonian theory and Prandtl-Meyer expansion for pressure drag with Van Driest skin friction and semi-empirical base drag prediction. The second scheme iterates body coordinates with the second-order shock-expansion theory and the same skin friction and base drag methods to minimize the total drag. A different shape is determined for each length-to-diameter ratio and Mach number. The first technique was found to calculate a reasonably accurate optimal shape, but did not predict accurate drag coefficients. It was found that the modified Newtonian theory plus Prandtl-Meyer expansion predicted pressure drag coefficients much too low whereas the second-order shock-expansion method gave good results. The second technique predicted both accurate optimal shapes and drag coefficients. Optimal shapes were predicted using the second techniques for Mach numbers 2-5 and length-to-diameter ratios of 4, 5, and 6. They were found to compare well with experimental data. (Author)

AD-A091 300/4 PC **A05**/MF **A01**
Illinois Univ. at Urbana-Champaign. Dept. of Aeronautical and Astronautical Engineering.
Gas Flow Resistance Measurements Through Packed Beds at High Reynolds Numbers.
Interim technical rept. Jul 78-May 80,
Stephen F. Wilcox, and Herman Krier. Mar 80, 94p AAE-80-1, UILU-ENG-80-0501, AFOSR-TR-80-1063
Grant AFOSR-77-3336

This work reviews the literature on gaseous flow pressure resistance in packed beds and found important differences depending on test conditions and Reynolds number ranges. A test apparatus was constructed which allowed for the testing over a wide range of pressures, test conditions, and Reynolds number range several orders of magnitude higher than previously tested. From the resulting data it was ascertained that the classical Reynolds number dependency of the coefficient of drag is not correct for Reynolds numbers greater than 1000. A new correlation for the coefficient of drag was developed, which indicated that a new factor, the kinetic energy of the gases being forced through the bed, must be taken into account. This formula was shown to be valid for a Reynolds number range 1,000 - 100,000, for particles ranging in diameter from 1 mm through 6 mm. This correlation of transient two-phase flows at high pressures, as needed in the modeling effort for deflagration-to-detonation (DDT) in granular beds of propellant. (Author)

CEA-R-5022 PC **A08**/MF **A01**
CEA Centre d'Etudes Nucleares de Saclay, Gif-sur-Yvette (France). Dept. des Rayonnements Ionisants.
Application of the Permeation to the Production of Low Radioactive Calibrated Gas Flows. Low Radioactive Tritium Measurement.
G. Pilot. Dec 79, 171p
In French.
U.S. Sales Only.

The permeation of compounds (HT, HTO, exp 131 ICH sub 3 , and exp 129 ICH sub 3) through organic membranes in view of producing low radioactive calibrated gas flows has been studied. This process of which the diffusion is the main stage enables respecting certain conditions (choice of the membrane, temperature, partial pressure differential) our aims to be reached with a good accuracy. In order to measure radioactivity of tritiated standard gases, a detector was built. This detector is an Oeschger type proportional counter with a total volume of 17.4 dm exp 3 and an useful volume of 3.9 dm exp 3 . In the conditions of operation, the background is of 1.7.10 exp -6 l s exp -1 cm exp -3 . The counter coupled with a feed-rack enables various samples to be measured and it is possible in the best conditions to detect some 10 exp -11 mu Ci cm exp -3 NTP. (Atomindex citation 11:525671)

CEGB-RD/B/N-4677 PC **A02**/MF **A01**
Central Electricity Generating Board, Berkeley (England). Berkeley Nuclear Labs.
Particle Deposition from Aqueous Suspensions in Turbulent Pipe Flow - a Comparison of Observed Deposition Rates and Predicted Arrival Rates.
R. S. Rodliffe. Nov 79, 22p
U.S. Sales Only.

At the present time, there appear to be only four adequately controlled and characterised experimental studies of particle deposition from single phase water in turbulent pipe flow. These are used to illustrate the ranges of applicability of methods for predicting particle arrival rates at tube walls. Arrival rates are predicted from mass transfer correlations and the theory of Reeks and Skyrme (1976) when transport is limited by Brownian diffusion and inertial behaviour, respectively. The regimes in which finite particle size limits the application of these methods are defined and preliminary consideration is given to the conditions under which gravitational settling may make a contribution to deposition in vertically mounted tubes. (Atomindex citation 11:525700)

CEGB-RD/B/N-4691 PC **A03**/MF **A01**
Central Electricity Generating Board, Berkeley (England). Berkeley Nuclear Labs.
'Distorted Structure Modelling' - a More Physical Approach to Rapid Distortion Theory.
A. M. Savill. Nov 79, 41p
U.S. Sales Only.

Rapid Distortion Theory is reviewed in the light of the modern mechanistic approach to turbulent motion. The apparent failure of current models, based on this theory, to predict stress intensity ratios accurately in distorted shear flows is attributed to their oversimplistic assumptions concerning the inherent turbulence structure of such flows. A more realistic picture of this structure and the manner in which it responds to distortion is presented in terms of interactions between the mean flow and three principal types of eddies. If Rapid Distortion Theory is modified to account for this it is shown that the stress intensity ratios can be accurately predicted in three test flows. It is concluded that a computational scheme based on Rapid Distortion Theory might ultimately be capable of predicting turbulence parameters in the highly complex geometries of reactor cooling systems. (Atomindex citation 11:525701)

FEI-929 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Obninsk. Fiziko-Energeticheskii Inst.
Analysis of Equations of Averaged Liquid Motion in an Intertubular Space.
Yu. S. Yur'ev, and G. F. Komyshnaya. 1979, 15p
In Russian.
U.S. Sales Only.

Given is a conclusion of equations of liquid averaged motion in an intertubular space. Analyzed are the numbers and obtained are two accurate analytical solutions of the equation system. This solutions are used as test variants for program debugging of quantitative calculations of complex flows in reactors and heat exchangers by the model of an anisotropic porous body. (Atomindex citation 11:525704)

IPP-4/181 PC **A02**/MF **A01**
Max-Planck-Inst. fuer Plasmaphysik, Garching (Germany, F.R.).

Comparison of MHD Pressure Losses of Liquid-Lithium Flows in Coaxial and Parallel Ducts, Passing Through Strong Transverse Magnetic Fields.
G. Trommer. Aug 79, 25p
U.S. Sales Only.

This report deals with theoretical calculations of MHD pressure losses of liquid-lithium flows in tubes of circular cross-section exposed to strong magnetic fields. Some simplifying assumptions were introduced, yielding an analytical solution which allows the pressure drop and losses in double tubes of coaxial geometry to be compared with those in normal flow pipes. The investigations show that coaxial ducts require much more pumping power than normal ones under similar conditions. This great difference of the properties of the two duct types will decrease if the pipes are embedded in materials of good electrical conductivity. In this case the normal duct will afford a drastic increase in the pressure drop, while the coaxial one will be nearly unaffected. But even under these conditions the losses of the latter will dominate. (Atomindex citation 11:512018)

JAERI-M-8466 PC **A03**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Natural Convection of High-Temperature, High-Pressure Gas in a Horizontal Annular Layer of Thermal Insulator, 2. Comparison Between Numerical and Analytical Solutions.
M. Ogawa, T. Takizuka, and K. Sanokawa. Oct 79, 32p
In Japanese.
U.S. Sales Only.

In the previous report, the procedure of numerical calculation was described for the natural convection in a horizontal layer of thermal insulator with variable physical properties. In the present report, the numerical solutions for constant thermophysical properties are compared with the analytical solutions by perturbation method. Both are in agreement in the range where the perturbation analysis holds good. The thermoconvective characteristics for constant physical properties are first examined by use of the perturbation solutions in order to study the effects of temperature dependency of the thermophysical properties. The analytical procedure requires far less computer storage and execution time than the numerical one. (Atomindex citation 11:525698)

N81-10017/4 PC **A04**/MF **A01**
European Space Agency, Paris (France).
Analysis of Calculated Three-Dimensional Inviscid Flow Fields with Embedded Shock Waves (Presentation of a Field Solution), Part 1.
C. Weiland, and H. J. Thies. Jul 79, 52p ESA-TT-558, DFVLR-FB-78-09
Transl. Into English of "Anal. Berechneter Dreidimensionaler Reibungsfreier Stroemungsfelder MIT Eingebetteten Verichtungsstoessen (Darstellung Einer Feldoesung) Teil 1", Rept. Dfvlr-FB-78-09 Dfvlr, Cologne, Apr. 1978. Original Report in German Previously Announced as N79-30155.

Flow fields around a number of different body contours, and calculated by means of a finite difference procedure are analyzed. The investigated fields are three dimensional in general. The analysis is carried out with the air of characteristics, streamlines, lines of constant static pressure and static density, and with the velocity vectors at the gridpoints in planes phi = const. Planes z = const lines of constant cross flow Mach number and the velocity vectors of the crossflow at the gridpoints are presented. The interval of freestream Mach number considered is 1.4 M sub infinity or = M or = 3, and the range of angle of attack alpha is up to 20 deg. The quality of the finite difference solution used is demonstrated by comparison with experimental data. The accuracy attained especially for the detection of the position and the contour of embedded shocks is very good.

N81-10335/0 PC **A02**/MF **A01**
von Karman Inst. for Fluid Dynamics, Rhode-Saint-Genese (Belgium).
A Kinetic Model for a Gas-Particle Flow.
R. Burmesterdebessaribas, L. Lourenco, and M. L. Riethmuller. Dec 79, 18p VKI-PREPRINT-1980-4
Submitted for Publication. Presented at Pneumotransport 5, Apr. 1980.

A model for gas particle flows is proposed which is applicable to pneumatic transport of relatively dilute suspensions with large particles. A theoretical prediction of particle density profiles is formulated, as well as length scales and non dimensional parameters. Histograms of particle velocity components and associated statistical quantities are measured. Traverses of particle mean horizontal components and of root mean square values of horizontal and vertical velocity components are also carried out, as well as of density profiles. The comparison between theoretical prediction and experimental results is satisfactory.

N81-10336/8 PC **A02**/MF **A01E**
von Karman Inst. for Fluid Dynamics, Rhode-Saint-Genese (Belgium).
Particle Number Density Measurement in a Gas-Solid Particle Flow.
L. Lourenco, and M. L. Riethmuller. Dec 79, 10p VKI-PREPRINT-1980-5
Submitted for Publication. Presented at Pneumotransport 5, Apr. 1980.

A digital method for the measurement of the particle density in a gas-solid flowing suspension was developed. The method consists of counting the number of particles which cross a control surface per unit time. The control surface is formed by a laser beam. It is shown that the number of particles crossing the control surface per unit time is related to the particle density and velocity within the limits of linearity of the method. A simple procedure is presented to determine this limit of linearity. This method was applied to particle density in a gas particle flow, and is shown to be a good complement to an analog method.

N81-10338/4 PC **A02**/MF **A01**
von Karman Inst. for Fluid Dynamics, Rhode-Saint-Genese (Belgium).
Optical Measurements of the Diffusion of a Heavy Gas in Turbulent Boundary Layers.
C. Borrego, and M. L. Riethmuller. 1980, 23p VKI-PREPRINT-1980-9
Submitted for Publication. Presented at von Karman Inst. Lecture Ser. On Meas. And Predictions of Complex Turbulent Flow, Rhode-Saint-Genese, Belgium, 11-15 Feb. 1980.

Wind tunnel studies of the release of a heavy gas into the atmosphere at ground level were conducted using laser Doppler velocimetry and a laser scatter system for concentration measurements. A comparison with more conventional concentration measuring techniques allowed the validation of both methods. The correlations between velocity and concentration show that the three regions in which the flow should be interpreted in a completely different manner.

N81-10339/2 PC **A04**/MF **A01**
Aeronautical Research Inst. of Sweden, Stockholm.
Turbulent Jets and Wakes and Semi-Analytic Calculations for the Weak Flows.
Final Report.
D. A. Humphreys. 1979, 66p FFA-TN-AU-1196
Contract FMV-F-INK-82223-74-001-07-001

From knowledge of the orders of magnitude of the individual terms occurring in the full equations of motion, various approximate sets of equations can be derived. For weak jets and wakes the lowest order mean longitudinal momentum equation reduces to only two terms. The effects of some of the remaining small terms were investigated one by one with a semianalytic procedure, relying on the order of magnitude separation between terms. In the applications presented, an additional assumption is made that the perturbing terms are slowly varying functions of downstream location. The effects allowed for are nonlinear convection, Reynolds normal stress, intermittency, and particulate contamination.

N81-10348/3 PC **A06**/MF **A01**
von Karman Inst. for Fluid Dynamics, Rhode-Saint-Genese (Belgium).
Hot Wire Techniques: Conditional Sampling and Intermittancy.
D. Olivari. 1980, 110p VKI-PREPRINT-1980-12
Submitted for Publication. Presented at Vki Lecture Ser. On Meas. And Predictions of Complex Turbulent Flows, Rhode Saint-Genese, Belgium, 11-15 Feb. 1980.

The technique of hot wire anemometry is described. Particular attention is given to: sensor types; calibration characteristics; control circuits; linearization; angular reponse; and measurement of turbulence. Some practical problems are also discussed. The feasibility and applications of conditional sampling of flow quantities is discussed in detail with special emphasis on the detection criteria for turbulent flow. Conditional averages and spatial structures are defined. The role of convention velocities in ensemble averages is evaluated.

PB81-800526 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Boundary Layer Control. November, 1979-October, 1980 (Citations from the NTIS Data Base).
Rept. for Nov 79-Oct 80,
Guy E. Habercom, Jr. Nov 80, 101p
Supersedes PB80-800337, and NTIS/PS-78/1150. See also 1969-1974, NTIS/PS-76/0927, 1975-October 1979, PB81-800534, and November 1979-October 1980, PB81-800526.

This bibliography contains citations of applicaiions to aerodynamics, hydrodynamics, turbomachinery and liquid flow. Discussions refer to components and configurations. Flow fields include subsonic, transonic, supersonic, and hypersonic. Analyses involve computerized simulations, mathematical models and methods, and numerical solutions. Additional topics are temperature effects, mechanical responses, unsteady dynamics, and heat and mass transfer. (This updated bibliography contains 94 citations, 43 of which are new entries to the previous edition.)

PB81-800534 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Boundary Layer Control. 1975-October, 1979 (Citations from the NTIS Data Base).
Rept. for 1975-Oct 79,
Guy E. Habercom, Jr. Nov 80, 221p

This bibliography contains citations of applications to aerodynamics, hydrodynamics, turbomachinery and liquid flow. Discussions refer to components and configurations. Flow fields include subsonic, transonic, supersonic, and hypersonic. Analyses involve computerized simulations, mathematical models and methods, and numerical solutions. Additional topics are temperature effects, mechanical responses, unsteady dynamics, and heat and mass transfer. (This updated bibliography contains 214 citations, none of which are new entries to the previous edition.)

SAND-79-2377C PC **A03**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Numerical Study of Natural Convection in a Horizontal Porous Layer Subjected to an End-to-End Temperature Difference.
C. E. Hickox, and D. K. Gartling. 1980, 31p CONF-801102-2
Contract EY-76-C-04-0789
ASME winter annual meeting, Chicago, IL, USA, 16 Nov 1980.

A numerical study of steady, natural convection in a fluid-saturated, horizontal, porous layer subjected to an end-to-end temperature difference is reported. The analysis is performed using a finite element computer program based on the Galerkin form of the finite element method. Heat transfer rates are predicted for aspect ratios ranging from 0.1 to 0.5 and Rayleigh numbers in the range 25 to 200. Representative plots of temperature and velocity fields are presented. Comparisons are made with an approximate analytical solution and regions of validity are identified for the analytical solution. (ERA citation 05:037074)

20E. Masers and Lasers

AD-A090 840/0 PC **A02**/MF **A01**
Westinghouse Research and Development Center, Pittsburgh, PA.
Thallium Mercury Laser Development.
Final rept. 1 Feb 79-31 Jan 80 on Phase 2,
C. S. Liu, D. W. Feldman, and J. L. Pack. 17 Apr 80, 18p Rept no. 80-9C2-HOTEX-R1
Contract N00014-78-C-0131

The major effort was to perform definitive gain measurements on discharge-excited T1-Hg laser mixtures and to demonstrate T1Hg laser output at 459 micrometers if the gain measurement indicated that laser tests were warranted. Gain and absorption measurements of the discharge containing high densities of mercury (3 x 10 to the 19th power cm -3) and thallium (6 x 10 to the 16th power cm -3) were undertaken. No transient gain was observed within the T1Hg* excimer band at 459 nm; on the contrary, a strong absorption from Hg2* molecules in this region was detected. (Author)

AD-A090 882/2 PC **A02**/MF **A01**
Texas Univ. at Austin. Electronics Research Center.
Low Inductance Spark Gap Switch for Blumlein-Driven Lasers,
J. W. Keto, T. D. Raymond, and S. T. Walsh. 20 Jun 79, 3p AFOSR-TR-80-0795
Contract F49620-77-C-0101
Pub. in Review of Scientific Instruments, v51 n1 p42-43 Jan 80.

No abstract available.

AD-A090 907/7 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Metal-Atom Resonance-Line Lasers.
Journal article,
Daniel J. Ehrlich, and Richard M. Osgood, Jr. 8 Oct 79, 13p JA-5022, ESD-TR-80-62
Contract F19628-80-C-0002
Pub. in IEEE Jnl. of Quantum Electronics, vQE-16 n3 p257-268 Mar 80.

No abstract available.

AD-A090 970/5 PC **A02**/MF **A01**
Yale Univ., New Haven, CT. Dept. of Engineering and Applied Science.
Free-Electron Laser with a Strong Axial Magnetic Field,
L. Friedland, and J. L. Hirshfield. 27 Feb 80, 6p AFOSR-TR-80-0976
Grant AFOSR-80-0025
Pub. in Physical Review Letters, v44 n22 p1456-1460, 2 Jun 80.

No abstract available.

AD-A091 012/5 PC **A04**/MF **A01**
Oklahoma Univ., Norman. Dept. of Physics and Astronomy.
Electron Impact of Laser Media.
Final scientific rept. 15 Jun 79-14 Jun 80,
David E. Golden. 14 Aug 80, 72p AFOSR-TR-80-1000
Grant AFOSR-75-2866

The experimental program is aimed at an understanding of the physics necessary for the design of lasers which are excited by electron impact. Electron impact excitation cross sections, optical branching ratios of the subsequent decays, excited state lifetimes, polarization of radiation, collisional deactivation, and energy transfer rates are measured. Cross sections for the excitation of fine structure levels and alignment and orientation parameters are also measured.

AD-A091 125/5 PC **A03**/MF **A01**
California Univ., Berkeley. Electronics Research Lab.
Effects of the Current Distribution on the Characteristics of the Semiconductor Laser with a Channeled-Substrate Planar Structure.
Interim rept.,
Chung Yih Chen, and Shyh Wang. Aug 80, 31p AFOSR-TR-80-1030
Contract F49620-79-C-0178

Effects of the current distribution along the junction plane on the lateral and longitudinal mode behaviors of the semiconductor laser with a channeled-substrate planar (CSP) structure are investigated experimentally and theoretically. A new laser structure of the double-current-confinement CSP type, which has two electrodes for pumping and only one channel for stimulated emission (TEPOSE), was employed for this study. Current distribution profile of this laser can be varied by changing the relative strength of the current in each electrode. Experimental results showed that an asymmetric current profile can degrade the fundamental-lateral mode operation. A theoretical model based on phase-locked two-mode excitation was deveoped to account for the far-field pattern of a TEPOSE laser with only one electrode excited. It is also found that nonuniform excitation over the lasing mode can lead to multi-longitudinal mode, probably due to nonuniformity in the quasi-Fermi level separation. The present study demonstrates the importance of symmetric and uniform current distribution in designing semiconductor lasers. (Author)

AD-A091 296/4 PC **A15**/MF **A01**
Alabama Univ. in Huntsville. School of Science and Engineering.
Development and Analysis of Closed Cycle Circulator Elements.
Final rept. 31 Jul 78-31 May 80,
Cornelius C. Shih, Gerald R. Karr, and James F. Perkins. May 80, 326p UAH-RR-244, DRSMI/RH-80-9-TR, AD-E950 045
Contract DAAK40-78-C-0219

A series of experiments with various flow rates of laser gas and coolants under several levels of energy inputs has been conducted on the Army Closed Cycle Circulator for pulsed EDL to collect sufficient data for flow calibration and coefficient determination. Verification of the theoretical models depicting the functions of the heat exchangers in maintaining the thermal balance in the flow through the steady and transient states are made through comparison with results of the experimental analysis. (Author)

IPF-79-6 PC **A03**/MF **A01**
Stuttgart Univ. (Germany, F.R.). Inst. fuer Plasmaforschung.
High Repetition Rate Electro-Optic Q-Switching of Nd exp 3+ : YAG Lasers Showing Strong Optical Birefringence.
1979, 32p
U.S. Sales Only.

Using a novel configuration of two coupled resonators, electro-optic Q-switching of cw-pumped Nd exp 3+ : YAG lasers has been investigated. This technique yields two linearly polarized output beams, with practically all the power contained in one beam. In the case of strong pumping, using high repetition rate flashlamp-pumping, the optimisation of mirror reflectivity leads to a single-resonator configuration. (Atomindex citation 11:511857)

N81-10420/0 PC **A05**/MF **A01**
Fraunhofer-Gesellschaft zur Foerderung der Angewandten Forschung e. V., Munich (Germany, F.R.). Inst. fuer Festkoeppertechnologie.
Materials Quality Investigation for Hetero Laser Diodes.
Final Report.
H. Reichl, and J. Mueller. Dec 79, 98p BMFT-FB-T-79-162
In German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

A method is described for determining minority carrier lifetimes in the active region of a double hetero laser diode. Lifetimes in the 5 to 9 nanosecond range were determined together with diffusion lengths of between 4.5 and 7 microns. Trap levels of between 0.9 and 1.3 eV were measured. A degredation dependent rise in photocapacity was observed. The Al profile in the diode's active region was determined from the Al (p, gamma) Si reaction.

UCID-18791 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Optical Alignment Device for Aligning an External Laser to an Arbitrary Axis.
J. E. Murray, and W. A. Jones. 25 Jun 80, 19p
Contract W-7405-ENG-48

An alignment device to simplify the alignment of an external laser to an arbitrary axis was constructed. It provides independent adjustments for the four required beam motions: two orthogonal translations and two orthogonal rotations about an external point. (ERA citation 05:037067)

UCRL-84082 PC **A02**/MF **A01**
Lawrence Livermore National Lab., CA.
Intensification of Rare Gas Halide Lasers with Application to Laser Fusion.
R. R. Jacobs, D. Eimerl, J. Goldhar, J. R. Murray, and W. R. Rapoport. 1980, 19p CONF-800965-1
Contract W-7405-ENG-48
European conference on optical systems and applications, Utrecht, Netherlands, 23 Sep 1980.

The two techniques of backward-wave Raman pulse compression and pulse stacking are reviewed in the context of using KrF lasers as drivers in inertial confinement fusion. Experimental and theoretical results on Raman pulse compression in methane are presented including data on 70 to 75% pump energy extraction by the counter propagating Stokes wave. Results from on-going pulse stacker/Raman compressor experiments are also described, along with future investigations in this general area. (ERA citation 05:035271)

20F. Optics

AD-A090 855/8 Not available NTIS
City Coll., New York. Dept. of Physics.
The Mean-Field Approximation and Validity of a Truncated Bloch Hierarchy in Absorptive Bistability,
H. J. Carmichael. 4 Dec 78, 13p ARO-13410.20-P
Grant DAAG29-76-G-0055
Availability: Pub. in Optica Acta, v27 n2 p147-158 1980 (No copies furnished by DTIC/NTIS).

Absorptive bistability in a Fabry-Perot cavity is discussed in the framework of coupled field equations for forwards and backwards wave amplitudes. Recently proposed equations based on truncated Bloch hierarchy are compared to equations derived without this truncation. The latter are valid throughout saturation where truncation of the Bloch hierarchy leads to inaccuracies. In this context the mean-field approximation for a Fabry-Perot is discussed. A new state equation is proposed as applicable to the Fabry-Perot case for weak absorption in a high Q cavity. (Author)

AD-A091 022/4 PC **A02**/MF **A01**
Rochester Univ., NY. Dept. of Physics and Astronomy.
Inversion Problem in Photon Counting with Dead Time,
L. Mandel. 11 Dec 79, 3p AFOSR-TR-80-0974
Grant AFOSR-76-2918
Pub. in Jnl. of the Optical Society of America, v70 n7 p873-874 Jul 80.

No abstract available.

AD-A091 321/0 PC **A05**/MF **A01**
Hughes Research Labs., Malibu, CA.
Infrared Fiber Optics.
Final technical rept. 14 Apr 78-12 Apr 80,
James A. Harrington, Roger R. Turk, D. M. Henderson, and Arlie Standlee. Sep 80, 84p RADC-TR-80-290
Contract F19628-78-C-0109

This final report summarizes a two-year research program to fabricate optical fibers that are transmissive between 1 and 12 micron. The ultimate goal of this program is to prepare infrared (IR) transmitting fibers with losses less than 5 dB/km. In preparing IR fibers with these low losses, we emphasized the extrusion of very pure KCl as this

material has demonstrated bulk losses equal to or less than 5 dB/km in the 2- to 6-micron region. Unfortunately, we were not able to extrude bulk KCl into fiber with losses even approaching the goal. During the two-year program, we improved our KCl fiber from an initial loss of 20,000 dB/km to a best value of 4,200 dB/km. The exceptionally high losses in extruded KCl fiber resulted from the poor surface quality of the fiber. During the extrusion process, the friction between the die and fiber resulted in fibers whose surfaces were highly irregular (fish-scale appearance). Although lubricants alleviated this problem, we found that the fibers still had poor transmission because the lubricants (polymers, in general) could not be completely removed. Extrusions (without lubricants) using different die materials, die shapes, temperatures (25 to 30 C), and extrusion rates (1 mm/hr to 1 cm/sec) did not improve the overall quality of the fiber's surface.

N81-10835/9 PC **A05**/MF **A01**
Siemens A.G., Munich (Germany. F.R.). Research Lab.
Tapping Elements for Optical Fibers.
Final Report.
H. H. Witte, F. Auracher, and M. Stockmann. Dec 79, 88p BMFT-FB-T-79-178
In German; English Summary. Sponsored by Bundesministerium fuer Forschung und Technologie.

A simple reproducible process for fabricating tapping elements is described. Optical losses are minimum. Thick film technology with conventional photolithography is used. Structures were designed to match the properties of the optically sensitive material. Theoretical considerations are presented and it is shown how optimum performance can be achieved. Concrete examples of realizations are given together with their characteristics and the results obtained. Practical applications in the data bus sector, e.g., for multiprocessing systems and TV program distribution networks, are presented.

PAT-APPL-6-187 106 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Huntsville, AL. George C. Marshall Space Flight Center.
Collimated Beam Manifold and Method for Using the Same.
Patent Application,
C. W. Campbell, and R. B. Owen. Filed 15 Sep 80, 15p N80-34251/2, NASA-CASE-MFS-25312-1
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An optical manifold transforms a collimated beam, such as a laser beam, into a number of parallel beams having uniform intensity or having a desired intensity ratio. The manifold comprises an optical substrate coated on its rear surface with a fully reflective layer and on its front surface with a partially reflecting layer with a reflectivity gradient. An input collimated beam entering the rear surface and impinging on the front surface is multiplicatively reflected between the front and rear surfaces producing a number of parallel beams that emerge from the front surface. The intensities of the emerging beams have a relationship that depends on the reflectivity (R1, R2, R3, R4, and R5) of the front surface at the points where the beams emerge. By properly selecting the reflectivity gradients, the emerging beams will have uniform intensity or a desired intensity ratio.

PAT-APPL-6-188 160 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Pasadena, CA. Pasadena Office.
A Fiber Optic Transmission Line Stabilization Apparatus and Method.
Patent Application,
G. F. Lutes, and K. Y. Lau. Filed 17 Sep 80, 31p N80-34250/4, NASA-CASE-NPO-15036-1
Contract NAS7-100
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A reference signal of RF frequency modulates .85 micrometer wavelength optical transmitter whose output passes through an optical filter and a voltage controller phase shifter such that the output of the phase shifter is provided to the fiber optic transmission line. At the receiving end of the fiber optic transmission line, the signal is demodulated and used to modulate a 1.06 micrometer optical transmitter. The output signal from the 1.06 micrometer optical transmitter is provided to the same fiber optic transmission line and passes through the voltage controlled phase shifter to a phase error detector. The phase of the modulation of the 1.06 micrometer wavelength signal is compared to the phase of the reference signal by the phase error detector which provides a phase control signal related to the phase difference. This control signal is provided to the voltage controlled phase shifter which alters the phase of both optical signals passing through until a predetermined phase relationship between modulation on the 1.06 micrometer signal and the reference signal is obtained.

PB81-115602 PC **A03**/MF **A01**
Agfa-Gevaert A.G., Munich (Germany, F.R.).
Rasteroptische Bauelemente (Strip Lens Components),
Hartmuth Buczek. Dec 79, 32p BMFT-FB-T-79-159
Also pub. as ISSN-0340-7608. Text in German, abstract in English.

The report relates to strip lens component for office copiers. With a strip lens, a subject is not reproduced as a whole by one channel, but a multitude of channels reproduce sections of the subject which compose the image on the image plane. This reproduction principle allows very short optical paths for the 1:1 image reproduction. The lens ridges required for the strip lens are made of plastic (PMMA) which is injection pressure molded. A test construction was set up to make 1:1 copies with the designed strip lens. This is to demonstrate that it is possible to reduce the optical path in an office copier from approx. 1030 mm (traditional lens) to approx. 110 mm (strip lens).

20G. Particle Accelerators

AD-A090 945/7 PC **A03**/MF **A01**
Naval Research Lab., Washington, DC.
Photoelastic Stress and Fracture Analysis of Two Neutron Tube Designs.
Final rept.,
V. J. Parks, and R. J. Sanford. 15 Oct 80, 26p
Rept no. NRL-MR-4363

Photoelastic stress analysis and fracture stress analysis were carried out on two-dimensional models of the cross-sections of the M5N and M19N designs of a neutron tube under axial load. Of special interest was the metal-ceramic interface, where failure had been experienced. Both types of analysis showed the M5N to be superior to the M19N for the given loading in the area of failure. Tangential stresses along the free surfaces, and mixed-mode stress intensity factors for various crack lengths along the interface are reported. (Author)

BMFT-FB-T-79-162 PC **A05**/MF **A01**
Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.).
Material Quality Investigation of Hetero Laser Diodes.
H. Reichl, and J. Mueller. 1979, 97p
In German.
U.S. Sales Only.

A method for the determination of minority carrier lifetime in the active region of a double hetero laser diode was developed. Lifetimes in the range 5 nsec to 9 nsec and diffusion length of 4.5 mu m to 7 mu m were measured. With an approved photocapacitance setup trap-levels of 0.9 eV and 1.3 eV were determined. A rise in photocapacity depending on the degradation was observed. By use of the Al(p, gamma)Si-nuclear reaction technique the Al profile in the active region was determined. (Atomindex citation 11:511807)

CEA-CONF-4671 PC **A03**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Service de Protection contre les Rayonnements.
Utilization and Health Physics of the GANIL (Grand Accelerateur National a Ions Lourds) (Large National Heavy Ion Accelerator).
J. Drouet, A. Leleux, G. Tousset, and M. Van den Bossche. 1979, 47p
In French.
U.S. Sales Only.

The Large National Heavy Ion Accelerator will enable all the sufficiently stable nuclei from the lightest to uranium to be accelerated to energies and with beam qualities not yet reached by any other accelerator. after a review of the characteristics of GANIL the new prospects opening for nuclear physics principally are indicated, along with its possible uses for atomic physics and astrophysics studies and its advantage for condensed media physics. The various health physics problems examined so far are then dealt with: calculation of shield thicknesses (physical hypotheses relative to the spectra of neutrons produced, mean free attenuation path of neutrons, fluence-dose equivalent conversion factors), assessment of the radioactive risks connected with activation of the air, assessment of the radioactive risks connected to the activation of structural materials. (Atomindex citation 11:517932)

CEA-CONF-4744 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Dept. de Physique Nucleaire.
First Results Obtained at Saturne II by Means of the SPES I Facility.
A. Boudard, G. Bruge, J. L. Escudie, J. C. Lugol, and C. Re. 1979, 1p CONF-790847-(Sum.)
International conference on high energy physics and nuclear structure, Vancouver, Canada, 13 Aug 1979.
U.S. Sales Only.

No abstract available.

CEA-CONF-4748 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Dept. de Physique Nucleaire.
Status Report on GANIL.
1979, 20p CONF-790743-10
Symposium on heavy ion physics from 10-200 MeV/A, Upton, NY, USA, 16 Jul 1979.
U.S. Sales Only.

In August 1975, the French government decided to start the construction at Caen (Normandy) of a national heavy ion facility, Ganil. This program is financed jointly by the I.R.F. (The Institute of Fundamental Research depending of the Atomic Energy Commission) and by the IN exp 2 P exp 3 (Institute for Nuclear and Particle Physics depending of the National Center for Scientific Research). Presently 150 persons are working on the Ganil site, mainly machine physicists and technicians. (Atomindex citation 11:525729)

DESY-SR-79/29 PC **A02**/MF **A01**
Deutsches Elektronen-Synchrotron, Hamburg (Germany, F.R.).
X-Ray Sources.
U. Bonse. Nov 79, 19p
U.S. Sales Only.

The author describes several possibilities for the production of X-radiation. Especially he discusses the use of bremsstrahlung at electron impact on solid targets and the synchrotron radiation. He presents some equations for the calculation of X-ray intensities. Especially the X-radiation from the DORIS storage ring is discussed. (Atomindex citation 11:514509)

SAND-80-1902C PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Pulsed Neutron Generator for Use with Pulsed Neutron Activation Techniques.
G. E. Rochau. 1980, 14p CONF-801053-1
Contract AC04-76DP00789
Water reactor safety research information meeting, Gaithersburg, MD, USA, 27 Oct 1980.

A high-output, transportable, pulsed neutron generator has been developed by Sandia National Laboratories for use with Pulsed Neutron Activa-

tion (PNA) techniques. The PNA neutron generator generates > 10 exp 10 14 MeV D-T neutrons in a 1.2 millisecond pulse. Each operation of the unit will produce a nominal total neutron output of 1.2 x 10 exp 10 neutrons. The generator has been designed to be easily repaired and modified. The unit requires no additional equipment for operation or measurement of output. (ERA citation 05:037451)

20H. Particle Physics

CEA-N-2099 PC **A06**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Dept. de Physique des Particules Elementaires.
DPHPE Activities During 1978.
Aug 79, 120p
In French.
U.S. Sales Only.

This annual report gives a short summary of experiments in progress and of approved proposals of experiments to be performed by the Elementary Particle Physics Department of Saclay, and also publication lists and informations about the Department activities during 1978. (Atomindex citation 11:515982)

DESY-79/61 PC **A02**/MF **A01**
Deutsches Elektronen-Synchrotron, Hamburg (Germany, F.R.).
TASSO Results on E exp + E exp - Annihilation Between 13 and 31.6 GEV and Evidence for Three Jet Events.
Sep 79, 17p CONF-790885-14
International symposium on lepton and photon interactions at high energy, Batavia, IL, USA, 23 Aug 1979.
U.S. Sales Only.

Hadron production by e exp + e exp - annihilation was analyzed for c.m. energies from 13 up to 31.6 GeV at PETRA. Results are reported on R and on gross features of the final states such as multiplicity and inclusive momentum spectra. No evidence was found for a contribution of the top quark. Jet formation was studied in detail. The transverse momentum of hadrons relative to the jet axis was found to increase strongly with c.m. energy. The broadening of the jets is not uniform in the azimuthal angle around the jet axis but tends to yield planar events with large and growing transverse momenta in the plane and small transverse momenta normal to the plane. The simple q anti q jet picture is ruled out. The observation of planar events shows that there are three basic constituents which turn into hadron jets. Indeed, several events with three well-separated jets of hadrons were observed at the highest energies. The data can be naturally understood in terms of hard gluon bremsstrahlung, with the quarks and gluons fragmenting into hadrons with limited transverse momenta. (Atomindex citation 11:512358)

DESY-79/67 PC **A04**/MF **A01**
Deutsches Elektronen-Synchrotron, Hamburg (Germany, F.R.).
Supersymmetric Particles at LEP.
G. Barbiellini, G. Coignet, M. K. Gaillard, G. Bonneaud, and J. Ellis. Oct 79, 51p
U.S. Sales Only.

The authors examine whether the supersymmetrization of nature at a mass scale up to 100 GeV can be confirmed or excluded by experiments with LEP. They review the qualitative features of the spectroscopy suggested by supersymmetric theories. Then they discuss possible production rates and means of detection of these particles at LEP. In this framework they make some remarks about other projects for future high energy physics machines which can be used for the study of supersymmetric phenomena. (Atomindex citation 11:515792)

DESY-79/71 PC **A03**/MF **A01**
Deutsches Elektronen-Synchrotron, Hamburg (Germany, F.R.).
E exp + E exp - Jets.
G. Schierholz. Oct 79, 34p CONF-790774-
SLAC summer institute on particle physics: quantum chromodynamics, Stanford, CA, USA, 9 Jul 1979.
U.S. Sales Only.

The author describes the application of quantum chromodynamics to e exp + e exp - annihilation into hadrons. In particular, he considers QCD predictions which are reliably calculable and can soon be verified by experiment. (Atomindex citation 11:515931)

DESY-79/73 PC **A02**/MF **A01**
Deutsches Elektronen-Synchrotron, Hamburg (Germany, F.R.).
Rapid Growth of Charged Particle Multiplicity in High Energy E exp + E exp - Annihilations.
R. Brandelik, W. Braunschweig, K. Gather, V. Kadansky, and K. Luebelsmeyer. Nov 79, 7p
U.S. Sales Only.

Hadron production by e exp + e exp - annihilation has been studied for c.m. energies W between 13 and 31.6 GeV. As a function of ln W the charged particle multiplicity grows faster at high energy than at lower energies. This risk is correlated with a rise in the plateau of the rapidity distribution. The cross section sd sigma/dx is found to scale within +-30% for x > 0.2 and 5 <- W <- 31.6 GeV. (Atomindex citation 11:515977)

DESY-79/75 PC **A02**/MF **A01**
Deutsches Elektronen-Synchrotron, Hamburg (Germany, F.R.).
Energy Scan for Narrow States in E exp + E exp - Annihilation at C.M. Energies Between 29.90 and 31.46 GeV.
Nov 79, 4p
U.S. Sales Only.

A fine energy scan has been performed to search for narrow states in e exp + e exp - annihilation at c.m. energies between 29.90 and 31.46 GeV. No such state has been observed. The 90% confidence upper limit on the leptonic decay width times the hadronic decay branching ratio is GAMMA/sub ee/ B/sub h/ < 1.6 keV. (Atomindex citation 11:515989)

DESY-79/76 PC **A02**/MF **A01**
Deutsches Elektronen-Synchrotron, Hamburg (Germany, F.R.).
Cutoff Dependence in Lattice phi sub 44 Theory.
K. Symanzik. Nov 79, 18p
U.S. Sales Only.

The author discusses corrections to the high temperature expansion of the lattice phi sub 44 theory in 4 + epsilon dimensions using the renormalization group. He works with vertex functions, the expansion of which is derived from an effective Lagrangian for large-cutoff behavior. He concludes that the numerical phi sub 44 results offer a test of the idea of asymptotic freedom. (Atomindex citation 11:511619)

DESY-79/78 PC **A03**/MF **A01**
Deutsches Elektronen-Synchrotron, Hamburg (Germany, F.R.).
Luminosity Functions for Two-Photon Processes in E exp + E exp - Collisions.
J. H. Field. Nov 79, 37p
U.S. Sales Only.

An analysis is given of the QED factors relating the cross section for e e implies e e X to the virtual 2-photon collision gamma * gamma * implies X. Only transverse photons are considered, but no kinematical approximations are made. The cases where none, one or both of the scattered electrons are detected at angles >> m/sub e//E (E = beam energy) are separately considered. A full discussion is given of the kinematical restrictions necessary to arrive at factorizible Equivalent Photon Approximation formulae, and quantitative comparisons are given. Also discussed are the rapidity distribution of the produced system X and restrictions on the effective two-photon luminosity due to angular cuts on produced particles. (Atomindex citation 11:512272)

DOE/ER/10365-1 PC **A02**/MF **A01**
Kentucky Univ., Lexington.
Nuclear Structure Studies of Transitional Nuclei. Progress Report, October 1, 1979-August 31, 1980.
S. W. Yates. 1980, 20p
Contract AS05-79ER10365

Systematic investigations of the nuclear level structures of stable heavy transitional nuclei are being performed by (n,n' gamma) reaction spectroscopy. Detailed gamma -ray excitation functions and angular distributions permit characterization of low-lying states, with particular emphasis on understanding collective excitations of both positive and negative parity. Questions regarding nuclear shapes, deformation effects, and the applicability of various nuclear models to these nuclei have been addressed. Completed studies of exp 194 Pt and exp 198 Pt reveal significant structural differences between these nuclei, and have led to studies of other transitional nuclei as the next step in a comprehensive examination of this mass region. Cross section systematics for the (n,n' gamma) reaction are being developed and, where possible, gamma -ray studies have been complemented by neutron detection time-of-flight measurements. 6 figures, 1 table. (ERA citation 05:035753)

FRNC-TH-870 PC **A08**/MF **A01**
Paris-11 Univ., Orsay (France).
Analysis of Neutrinos Produced by 400 GeV Proton Interaction in 'Beam Dump' Experiment.
S. Loucatos. 1979, 170p
In French.Thesis.
U.S. Sales Only.

By reducing the neutrino flux from conventional sources (pi , K and hyperons) by several orders of magnitude an attempt is made to find a signal of events due to new sources. Two independent methods (analysis of events with a mu among the interaction products in the detector and analysis of those with no mu) led to the same result: the observation of excess events due to the interaction of penetrating particles in the detector. The excess observed was interpreted as a neutrino flux due to the disintegration of shcrt-lived particles produced by interaction of protons with target-absorber nucleons. For the assumption that all the neutrinos come from the disintegration of charmed mesons produced in association, the charmed meson production cross-section was calculated on the basis of different production models: 20 mu b< sigma(pp implies DD+X)<45 mu b. These values are higher than predicted by most theoretical models which are based on the parton model and the quantum chromodynamic theory. Moreover the neutrino flux excess observed being three times smaller than that observed by the BEBC and Gargamelle bubble chambers, which also took part in the Beam Dump experiment, the calculated cross-section is lower than that obtained by the bubble chamber. No explanation for the disagreement has been found. Other possible interpretations of the observed excess have been considered. One of the chief purposes of the Beam Dump experiment was to look for new penetrating particles which would produce multimuons with a higher yield than v mu , but the yield observed is consistent with the v mu yield expected. From a study of the two- mu events observed and the absence of three- mu events it was possible to obtain an upper limit for the contribution of a new particle to multimuon production in neutrino experiments: 0.3% for dimuons and 10% for trimuons. (Atomindex citation 11:509969)

FRNC-TH-878 PC **A07**/MF **A01**
Paris-11 Univ., Orsay (France).
Study of the Coefficients of Internal Conversion for Transition Energies Approaching the Threshold.
N. Farani Coursol. 1979, 130p
In French.
U.S. Sales Only.

Internal conversion coefficients were determined experimentally with great accuracy for areas of transition energies which constitute tests for the theories (energies at most ten keV above the K shell threshold); then the results obtained were compared with the values calculated (or to be calculated) from theoretical models. Owing to the difficulties raised by the precise determination of the internal conversion coefficients (ICC), in the first

stage we selected radionuclides with a relatively simple decay pattern, the 30-keV transitions in / sup 93m/Nb, 35-keV in /sup 125m/Te, 14-keV in exp 57 Fe and 39-keV in /sup 129m/Xe. It was observed that 'problems' exist with respect to the ICC's of the great multipolarity transitions, so the transitions of this kind were examined in a systematic manner. The possibility of penetration effects occurring for the transitions studied experimentally was examined. The considerations are presented which 'authorized' us to disregard the dynamic part of the ICC for the transitions approaching the threshold (L selection rules and lifetime of nuclear levels in relation to Weisskopf-Moszkowski estimations). The Kurie straight line was determined experimentally for the beta exp - transition and the Q/sub beta / was evaluated with an important accuracy gain compared with the values available at present. Finally, a certain number of ICC's of transitions already determined with good precision were recalculated, in order to extend our analysis and detect any possible systematic errors. (Atomindex citation 11:516101)

HU-P-171 PC **A02**/MF **A01**
Helsinki Univ. (Finland). Dept. of High Energy Physics.
Study of the Reaction Anti Pp Implies delta exp +-+- (1232) + X at 22.4 GeV/C.
D. I. Ermilova, Zh. S. Takibaev, and T. Temiraliev. May 79, 16p
U.S. Sales Only.

We present inclusive and semi-inclusive cross sections for delta exp +-+- (1232) production in the entire kinematical region. The x and y/sup */ distributions (for delta exp -- (1232) reflected about x = y/sup */ = 0) extend into the forward hemisphere. The fraction of delta exp +-+- (1232) production seems to be constant as a function of topology. The average transverse momentum is 0.43 +- 0.10 GeV/c and the slope of the p/sub T/ exp 2 distributions is -4.3 +- 1.0 (GeV/c) exp 2 . The spin density matrix element rho sub 33 is 0.20 +- 0.07, this value favoring the absorptive OPE model. (Atomindex citation 11:512362)

IFIN-FT-157-1978 PC **A03**/MF **A01**
Institutul Central de Fizica, Bucharest (Romania).
Closed Forms for the Matrix Elements of the Quadrupole Collective Operators.
A. A. Raduta, V. Ceausescu, and A. Gheorghe. Jul 78, 37p
U.S. Sales Only.

Compact analytical expressions of the matrix elements for the spherical phonon operators and the elementary anharmonicities in a basis of explicit eigenfunctions of the harmonic quadrupole collective Hamiltonian are established. An algorithm for the calculation of the matrix elements of any many-phonon quadrupole operator is also presented. (Atomindex citation 11:512567)

IFVE-OTF-79-32 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Serpukhov. Inst. Fiziki Vysokikh Energii.
Influence of Mass Parameters on Asymptotic Vehavior in the Ladder Model.
V. Yu. D'yakonov. 1979, 15p
In Russian.
U.S. Sales Only.

The Bethe-Salpeter equation in the ladder approximation of the lambda phi exp 3 theory for forescattering amplitude with the massive exchange is investigated. Equations in a deep inelastic (Bjoerken) region are solved for small and large values of the exchanged mass. The solutions obtained have a scale-invariant form explicitly. Amplitude asymptote in the Regdge-Bjeorken region has a power nature. Work results permit one to draw the conclusion that scale invariance of the amplitude in the lambda phi exp 3 theory is conserved in all the range of exchanged mass values and, therefore, the exchanged mass effects insignificantly scaling properties of the amplitude in the Bjoerken region. (Atomindex citation 11:511569)

INIS-mf-5454 PC **A03**/MF **A01**
Universidad Nacional Autonoma de Mexico, Mexico City. Facultad de Ciencias.
Elastic Scattering of Polarized Protons by exp 20 Ne Between 4.5 MeV and 5.5 Mev.
Thesis (B.Sc.),
O. L. Avila A. 1979, 47p
In Spanish.
U.S. Sales Only.

Starting with the study of the exp 20 Ne(p,p) exp 20 Ne nuclear reaction, we obtained information about the nuclear structure of exp 21 Na. The experiment was made at Notre Dame University; a target of exp 20 Ne was bombarded with polarized protons, changing the incident energy of them between 4.5 MeV and 5.5 MeV at intervals of 10 keV. Fourteen detectors were set covering angles from 35 degrees until 165 degrees, with intervals of 10 degrees each. In this form measurements for computing polarization and differential sections were obtained, with them a phase shift analysis was made, and the parameters associated with two of the excited levels of the composite nucleus exp 21 Na that are viewed as resonances in the cross section were settled; those resonances correspond to a level P/sub 3/2/ of excitation 6.877, a total width of 36 keV, and an F/sub 7/2/ level of excitation energy 6.992 and total width of 48 keV. I hope that these results will be part of a set of values that will be utilized in order to confront them with the existing nuclear models. (Atomindex citation 11:516026)

INIS-mf-5475 PC **A04**/MF **A01**
Institutul Central de Fizica, Bucharest (Romania).
Annual Report. Theoretical Physics '78.
Nov 78, 64p
U.S. Sales Only.

The volume reports on the work done in the Department of Fundamental Physics, the Institute for Physics and Nuclear Engineering, in 1976-77 and the first part of 1978. The papers included are devoted to developments in general theoretical physics and the theoretical aspects in the physics of elementary particles, nuclei and condensed matter. (Atomindex citation 11:514767)

INIS-mf-5580 PC **A03**/MF **A01**
Cologne Univ. (Germany, F.R.). Mathematisch-Naturwissenschaftliche Fakultaet.
Investigation of the Two-Photon Decay Following the Neutron Capture in Hydrogen.
Diss. (D.Sc.),
N. Wuest. 13 Jan 78, 39p
In German.
U.S. Sales Only.

The continuous two-photon radiation, resulting from thermal neutron capture in hydrogen, has been measured. This reaction can be described in second-order perturbation theory and occurs besides the dominating 2223.4 keV single-photon radiation. The theoretical ratio between two-photon and one-photon processes is 2.8 x 10 exp -7 for the case considered here, so coincidence experiments with extremely high sensitivity have to be performed. In order to exclude systematical errors, three measurements with a different experimental set-up have been performed. Besides the total cross section for the two-photon process, the differential cross section has been studied in one of the experiments as a function of the energy ratio of the two photons. For the branching ratio between the two- and one-photon process an upper limit of 2 x 10 exp -5 could be obtained. So the hypothesis that the neutron capture state and the deuterium ground state are non-orthogonal is shown to be false. (Atomindex citation 11:516520)

INIS-mf-5586 PC **A05**/MF **A01**
Tuebingen Univ. (Germany, F.R.). Fachbereich Physik.
NMR Studies on exp 95 Mo, exp 97 Mo, exp 89 Y, and exp 109 Ag to Determine the Ratio of Quadrupole Moments of Mo Isotopes and for the Detection of Chemical Exchange Processes in Yttrium and Silver Compounds.
Diss. (D.Sc.),
J. Kronenbitter. 15 Feb 77, 83p
In German.
U.S. Sales Only.

By relaxation time measurements of the exp 95 Mo and exp 97 Mo isotopes in aqueous K sub 2 MoO sub 4 solutions it was possible to determine the ratio of the quadrupole momenta of these nuclei to be (Q(exp 97 Mo)/Q(exp 95 Mo)) = 11.4 +- 0.3. This results as well as further NMR measurements show that this ratio can only roughly be extracted from atomic beam resonance measurements of the Mo atom ground level. Recently developed measuring techniques to determine very long relaxation times T sub 1 and T sub 2 in nuclei with weak NMR signals are described. With these techniques it became possible to observe the appearance of polymerization products by the determination of the relaxation times of exp 89 Y in aqueous Y(NO sub 3) sub 3 solutions with different pH values and to estimate the lifetimes of these products. The chemical shift of the exp 109 Ag resonance as a function of the salt concentration has been determined in solutions of AgNO sub 3 , AgCl and AgBr in 70% ethylamine solution in water at concentrations between 20 millimolar and 3 molar. (Atomindex citation 11:515208)

INIS-mf-5592 PC **A08**/MF **A01**
Bergen Univ. (Norway). Fysisk Inst.
Nuclear Spectroscopy of Ca and Sc Isotopes from Inelastic Scattering and One-Nucleon Transfer Reactions on a Radioactive exp 41 Ca Target.
Thesis (Dr.Phil.),
P. Vold. Apr 78, 161p
U.S. Sales Only.

The structure of energy levels in exp 40 , exp 42 Ca and exp 42 Sc has been studied using inelastic proton scattering and one-nucleon stripping and pick-up transfer reactions on a exp 41 Ca target. Data have given the following information on the properties of the exp 41 Ca ground state wave function; i) the exp 41 Ca (g.s.) looks very much like an f/sub 7/2/ neutron coupled to the exp 40 Ca (g.s.) core. ii) The core-excited component of the exp 41 Ca (g.s.) is determined to be 10 or less. It was inferred that the main constituents of the spectroscopic strength leading to the (f/sub 7/2/) exp 2 , (f/sub 7/2/p/sub 3/2/)/sub t=1/ and (f/sub 7/2/p/sub 1/2/)/sub T=1/ configurations have been identified. This was used to deduce the effective two-particle matrix elements for these configurations. The exp 42 Sc and exp 42 Ca data result in excellent agreement for the T=1 members of the (f/sub 7/2/) exp 2 multiplet while the (f/sub 7/2/p/)(/sub T=1/) matrix elements derived from the exp 42 Sc data are about 0.2 MeV more repulsive than those obtained from the exp 42 Ca data. The (f/sub 7/2/d/sub 3/2/ exp -1) matrix elements derived from the present (exp 3 He, alpha) data were compared to the corresponding values obtained from one-nucleon stripping to mass 34 nuclei. The two sets of matrix elements are in very good agreement. The exp 40 Ca values are also well reproduced by calculations using the modified surface delta interaction. The experimental spectroscopic factors to both the T=0 and T=1 states of the (f/sub7/2/) exp 2 multiplet are in remarkably good agreement with the predicted values of the coexistence model considering the simplicity of this model. (Atomindex citation 11:516243)

INP-973/PL PC **A02**/MF **A01**
Institute of Nuclear Physics, Krakow (Poland).
Matrix-Elements of Two-Particle Residual Interaction in the Shell-Model Formalism with the M.S.D.I. Approximation. Part 2.
A. Jasielska, and S. Wiktor. 1977, 15p
U.S. Sales Only.

The table of two-particle matrix elements calculated according to the formalism of MSDI approximation for the orbits 1f/sub 7/2/, 2p/sub 3/2/, 2p/sub 1/2/ and 1f/sub 5/2/ and published previously is now supplemented by inclusion of the 1g/sub 9/2/ orbit. (Atomindex citation 11:512511)

IPNO-TH-78-52 PC **A06**/MF **A01**
Paris-11 Univ., Orsay (France). Inst. de Physique Nucleaire.
Microscopic Study of the Optical Potential of the Nucleon-alpha Elastic Scattering at Low Energy Calculation of Phase Shifts and Cross Sections.
M. Lassaut. 1979, 118p
In French.Thesis.
U.S. Sales Only.

The nucleon-alpha optical potential is calculated within a microscopic model including exchange ef-

fects. It has been shown that, for center-of-mass energies less than 20 MeV, this potential is purely real and given as the sum of a local direct term and a nonlocal-exchange term. The calculations are performed using different nucleon-nucleon interactions: on one hand, the Brink and Boeker B sub 1 and C sub 1 interactions and the Banerjee-Campi-Sprung (G-O) density dependent interaction, that have good saturation properties and reproduce well the alpha particle binding energy and radius; on the other hand, the Soper, Serber and Rosenfeld interactions, which were ajusted so that they reproduced the excited state spectrum of light nuclei. One has then noticed that the exchange term is always very important and strongly nonlocal. One has looked for local equivalent potentials to the nonlocal ones. This is not straight forward because the nonlocality range of the potentials is large and one has then studied two approximation methods: the first one was proposed by Perey-Saxon, the second one was recently derived by Peierls-Vinh Mau and leads to a better approach of the exact potential when the range of the non locality is large. For these two approximations the non locality induces an energy dependence into the nucleon-alpha local equivalent potential but the Peierls-Vinh Mau approximation alone leads to an angular momentum dependence for the potential. Finally, the neutron-alpha elastic scattering phase shifts (s, p/sup 1/2/ and p/sup 3/2/) and cross sections are calculated for energies below 20 MeV. (Atomindex citation 11:512532)

IPNO-TH-79-20 PC **A03**/MF **A01**
Paris-11 Univ., Orsay (France). Inst. de Physique Nucleaire.
Gauge Field Configurations in Curved Space-times (II).
H. Boutaleb-Joutei, A. Chakrabarti, and A. Comtet. May 79, 39p
U.S. Sales Only.

The study of gauge field configurations in curved spaces is continued with the aid of the formalism and results of a previous paper. A class of static, finite-action, self-dual solutions of SU(2) gauge fields on a Euclidean section of de Sitter space is presented. The action depends on a continuous parameter. The spin connection solution is obtained as a particular case and a certain passage to the limiting case of a flat space is shown to reproduce the Euclidean Prasad-Sommerfield solution. The significance and possible interest of such solutions are discussed. The results are then generalized to a non-Einstein but conformally flat space, including de Sitter space as an Einstein limit. Next Baecklund-type transformations are constructed starting from self-duality constraints for such curved spaces. These transformations are applied to the above-mentioned solutions. The last two sections contain remarks on solutions with a background Robinson-Bertotti metric and on static, axially symmetric solutions. (Atomindex citation 11:511564)

IPNO-TH-79-32 PC **A02**/MF **A01**
Paris-11 Univ., Orsay (France). Inst. de Physique Nucleaire.
Ground State Admixture into the PSI'' (3.772).
J. M. Richard. Jun 79, 13p
U.S. Sales Only.

The usual potential model is applied to estimate the orbital mixing into the PSI'' (3.772), whose leptonic width emerges to be too small. It is underlined that the admixed S-wave component is not saturated by the first radial excitation and contains a sizeable part of the ground state. This property probably survives when conventional tensor forces are supplemented by other sources of orbital mixing like multiquark corrections. The role of orbital impurities in the radiative decays of the PSI' and the PSI'' is also discussed. (Atomindex citation 11:512323)

IPNO-TH-79-36 PC **A02**/MF **A01**
Paris-11 Univ., Orsay (France). Inst. de Physique Nucleaire.
Lower Bounds for nu and Q exp 2 Values Leading to Scaling in the Simple Parton Model.
R. S. Nataf. Jun 79, 10p
U.S. Sales Only.

The simple parton model leads to the Bjorken scaling law only for rather large values of the transfer. For small values, the scale invariance is broken by a purely kinematical effect which is shown to depend on (1+(4M exp 2 x exp 2 /Q exp 2))/sup 1/2/-1, M being the mass of the target nucleon. Thus, one has to consider nu >=5M (5GeV) and Q exp 2 >=10M exp 2 x (9GeV/c) exp 2 for the whole x range) if it is demanded that scaling holds within 10% to error. (Atomindex citation 11:512309)

ITEP-75(1979) PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Teoreticheskoi i Eksperimental'noi Fiziki.
Instanton-Like Solutions for the Supersymmetric Chiral Models.
A. V. Mikhailov, and A. M. Perelomov. 1979, 7p
U.S. Sales Only.

Instanton-like solutions for the two-dimensional supersymmetric chiral models are found. There is used the notion of the superspace whose points are defined by two commuting and two anticommuting coordinates. The chiral superfield is defined on the Grassman algebra. The obtained topological charge Q takes the values in the even component of the Grassman algebra. The duality equations of motion are solved in terms of nonhomogeneous variables. The equations imply that the c-number part of Q gives a precise lower bound to the action while the Grassmanian part of Q is equal to the stationary point value of the action. (Atomindex citation 11:511605)

JAERI-M-8229 PC **A04**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
ORIGEN-JR: A Computer Code for Calculating Radiation Sources and Analyzing Nuclide Transmutations.
K. Koyama, S. Miyasaka, and N. Yamano. May 79, 62p
U.S. Sales Only.

A computer code for calculating radiation sources and analyzing nuclide transmutations has been developed on the basis of the familiar code ORIGEN for reliable shielding calculations of spent fuel casks, fuel reprocessing plants, etc. Energy spectra of neutron sources in spontaneous fissions and (alpha , n) reactions are available in the code. Angle-dependent (alpha , n) reaction cross sections of eight nuclides (exp 9 Be, exp 10 B, exp 11 B, exp 13 C, exp 14 N, exp 17 O, exp 18 O, exp 19 F) are calculated by using the statistical model and compiled as an (alpha , n) data library. In addition to spectrum indices adopted in the ORIGEN code, one-group cross sections for each reaction can be used to treat precisely the burnup conditions in a reactor core. Neutron and gamma-ray source data are generated in the same format as in shielding codes QAD-P5, ANISN and DOT-III. (Atomindex citation 11:518690)

JINR-E-1-12298 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
Study of Azimuthal Correlations in Multiparticle p Tilde p Interactions at 22.4 GeB/C.
B. V. Batyunya, I. V. Boguslavsky, and I. M. Gramenitsky. 1979, 16p
U.S. Sales Only.

The inclusive azimuthal distributions of pion pairs are studied in anti pp interactions at 24.4 GeV/c. The dependence of the asymmetry parameter on multiplicity, particle rapidity difference, longitudinal and transverse momentum is studied The rho sub 0 and delta exp ++ resonance production effect on azimuthal distributions is estimated. The results show that neither the resonance production nor the Bose-Einstein symmetry effect suffice to explain the data. (Atomindex citation 11:512350)

JINR-R-1-11516 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
Search for New Particles Decaying to lambda (K Exp 0)+ Hadrons.
G. Ajkhner, A. N. Aleev, and V. A. Aref'ev. 1978, 16p
In Russian.
U.S. Sales Only.

By means of a magnetic spark spectrometer the search for new particles produced by neutrons with an average energy of 45 GeV on a carbon target is performed. They decay through the channels lambda pi exp + , K exp 0 (K exp 0) pi /sup +-/, and lambda pi exp + pi exp - and lambda K exp + K exp - . Estimates of partial cross section upper limit for the production of charmed particles C exp + (2260) and D/sup +-/ (1870) with the relative momentum x>0.5 are obtained. sigma/sub C exp + /xBR(C exp + implies lambda pi exp +) <2x10/sup -31/cm exp 2 sigma/sub D exp +- /)xBR(D exp +-) implies K exp 0 pi exp +- <2.5x10/sup-31/cm exp 2 where BBR is the partial probability of the decay. (Atomindex citation 11:512346)

JINR-R-10-12655 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Computing Techniques and Automation.
Software for Processing Experimental Data from Magnetic Spectrometer with Wire Spark Chambers.
L. S. Azhgirei, I. K. Vzorov, and V. V. Ivanov. 1979, 20p
In Russian.
U.S. Sales Only.

The software for processing experimental data obtained during measurements of nuclear interactions of relativistic protons and deuterons is described. The measurements were performed by means of an one-arm magnetic spectrometer with wire spark chambers on-line with the BESM-4 computer. The experimental data was processed in a few steps with the CDC-6500 computer. On the whole the data processed amounted approximately 2.10 exp 6 events. (Atomindex citation 11:528968)

JINR-R-4-12392 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Transition Densities and Electroexcitation of Nuclear Dipole States.
M. I. Baznat, N. I. Pyatov, and V. M. Shilov. 1979, 14p
In Russian.
U.S. Sales Only.

The transition densities for the 1-dipole excitations of spherical nuclei are calculated in the framework of self-consistent microscopic approach. It is found that in intermediate-mass and heavy nuclei the transition density for the giant-resonance states varies from volume oscillations to the surface shape with increasing the excitation energy. The deep volume oscillations are characteristic for the transition density of high-energy excitations. The form factors for the inelastic electron scattering were calculated in DWBA. It is shown that the variation of transition density affects essentially the calculated form factors. The volume transition density is the characteristic of the spectrum of nuclear excitation below the E1 resonance maximum. Volume oscillations of the transition density is characteristic of the high-energy region of the spectrum. It is found that the multipole analysis can't be used in considering the whole spectrum by means of one of the same transition density. The results obtained are consistent with the qualitative features of the giant dipole resonance in the droplet model. (Atomindex citation 11:516059)

KFK-2886 PC **A05**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Kernphysik.
Photoproduction of Proton-Antiproton Pairs on Hydrogen in the Energy Region 4.74 - 6.55 GeV.
A. Markou. Dec 79, 90p
In German.Thesis.
U.S. Sales Only.

The photoproduction of proton-antiproton pairs on hydrogen has been investigated in the elastic reaction gamma p implies p anti p p. In an experiment at the Deutsches Elektronensynchrotron DESY this reaction has been identified. The distribution of the p anti p invariant mass has been measured and the basic features of the dynamics by which the reaction proceeds have been identified. The kinematic region for the experiment was 0.345 <= t <= 7.343 (GeV/c)2. The experiment used a tagged photon beam, a magnetic spectrometer with proportional and spark chambers, a time of flight system, and a Cerenkov counter. From a

total number of 1.5 x 10 exp 6 triggers about 65 events of the reaction gamma p implies p anti p p have been identified by using the following criteria: the mass of at least the negative outgoing particle, computed from the time of flight information, was about the proton mass and the kinematic analysis of the event yielded the largest probability for the hypothesis gamma p implies p anti p p in comparison with the competing reactions; the basic features of the dynamics by which the reaction proceeds have been identified through a comparison of the experimental momentum- and four momentum transfer distributions with the corresponding distributions of simulated events; the simulated events have been generated by Monte Carlo methods according of forward or backward p anti p photoproduction. The result of the comparison was that in the investigated reaction a proton-antiproton pair is produced in backward direction in the c.m. system and the angular distribution of the anti p in the p anti p rest system is nearly isotropic. It was possible to calculate the invariant mass of the proton-anti-proton pair unambiguously. The resulting p anti p mass distribution shows within our statistics no significant structures which would indicate the existence of resonances in the p anti p system. (Atomindex citation 11:515998)

LA-8374-MS PC **A19**/MF **A01**
Los Alamos Scientific Lab., NM.
Graphs of the Cross Sections in the Recommended Monte Carlo Cross-Section Library at the Los Alamos Scientific Laboratory.
P. D. Soran, and R. E. Seamon. May 80, 429p
Contract W-7405-ENG-36

Graphs of all neutron cross sections and photon production cross sections on the Recommended Monte Carlo Cross Section (RMCCS) library have been plotted along with local neutron heating numbers. Values for anti nu , the average number of neutrons per fission, are also given. (ERA citation 05:035764)

NBI-HE-79-33 PC **A03**/MF **A01**
Niels Bohr Inst., Copenhagen (Denmark).
Two New Families of Solitons of an Inherent Quantum Nature.
H. Flyvbjerg. Oct 79, 26p
U.S. Sales Only.

Two new families of solitons in three-dimensional space are presented. The solitons are non-classical, of an inherent quantum nature in the sense that they occur in the quantized version of theories which at the classical level allow for no solitons. The solitons in question are a family of magnetic vortex lines in the Coleman-Weinberg model, quantum relatives to the classical Nielsen-Olesen vortex lines, and a family consisting of a magnetic monopole and dyons in a massless, scalar, SU(2) gauge theory. The latter solitons are quantum relatives to the classical 't Hooft-Polyakov monopole and Julia-Zee dyons. (Atomindex citation 11:514852)

NBI-HE-79-38 PC **A03**/MF **A01**
Niels Bohr Inst., Copenhagen (Denmark).
Formation of a Random Color Magnetic Quantum Liquid in QCD.
J. Amjoern, and P. Olesen. Nov 79, 42p
U.S. Sales Only.

It is shown that a quantum state consisting of a condensate of color magnetic flux tubes is formed in QCD for a rather weak coupling g exp 2 /4 pi =0.37. This result is obtained in a systematic search for energy minimalizing forms of the QCD unstable magnetic mode. The magnetic field is argued to be of a 'random' type with $<H>=0$ and $<H \exp 2> \text{ not} = 0$ in any point. (Atomindex citation 11:514786)

NPRU-79/6 PC **A10**/MF **A01**
University of the Witwatersrand, Johannesburg (South Africa). Nuclear Physics Research Unit.
Proceedings of the International Conference on Dynamical Properties of Heavy-Ion Reactions Held at the University of the Witwatersrand, Johannesburg, South Africa, August 1-3, 1978. V. 4. Post-Conference School Invited Papers 'Topical Themes in Heavy-Ion Scattering', August 9-11, 1978.
J. P. F. Sellschop, C. Toepffer, R. H. Lemmer, and C. A. Engelbrecht. 1978, 201p CONF-780857-(V.4)
Conference on dynamical properties of heavy-ion reactions, Johannesburg, South Africa, 1 Aug 1978.
U.S. Sales Only.

At this post-conference school invited lectures on 'Topical themes in heavy-ion scattering' were delivered. The following topics were discussed; 1) the measurement of magnetic moments of nuclear states of high angular momentum; 2) nuclei at very high angular momentum; 3) multi-step direct reaction analysis of deep inelastic spectra in nuclear reactions: 4) experiments relating to quantum electrodynamics of strong field and 5) the role of deep inelastic processes in nuclear physics. (Atomindex citation 11:516475)

N81-10823/5 PC **A03**/MF **A01**
Montpellier Univ. (France). Dept. de Physique Mathematique.
Leptonic and Hadronic Corrections to Mass and Propagator of W and Z Bosons.
M. Capdequi-peyranere, F. M. Renard, and M. Talon. Jan 80, 30p PM/80/1

The effects of high order terms due to fermion loops (lepton and quarks) on the properties of W and Z bosons are studied by means of the propagator formalism. In particular, the boson mass ratio Mw sq/Mz sq cos sq theta, and the energy dependence of the form factors associated to time-like or space-like M, W or gamma exchanges are more accurately determined. Results consist in making explicit the effects of the energy dependence of the W and Z propagators, taking into account the existence of strong interactions between quarks and the formation of vector mesons, calculating the corrections to the above form factors, and discussing quantitatively the effects of lepton and quark doublets on the ratio, the angle, and the form factors.

PB81-121014 Not available NTIS
National Bureau of Standards, Washington, DC.
Kerma Factors for Neutron Energies Below 30 MeV.
Final rept.,
R. S. Caswell, J. J. Coyne, and M. L. Randolph. 1980, 38p
Sponsored in part by Department of Energy, Washington, DC.
Pub. in Radiation Research 83, n2 p217-254 1980.

Kerma factors for neutrons have been calculated from thermal neutron energies to 30 MeV. In addition to a 'point' at 0.0253 eV, there are 116 contiguous energy bins extending from 0.026 eV to 30 MeV. Values are given for 19 elements or nuclides: H, (6)Li, (7)Li, B, C, N, O, F, Na, Mg, Al, Si, P, S, Cl, Ar, K, Ca, and Fe. The chief source of nuclear data is the Evaluated Nuclear Data File ENDF/B-4. The basis of the calculations is discussed, and comparison is made with some other tabulations.

UNI-GRAZ-UTP-12-79 PC **A02**/MF **A01**
Graz Univ. (Austria). Inst. fuer Theoretische Physik.
Classical Solutions of Nonlinear sigma-Models.
H. Mitter, and F. Widder. Sep 79, 25p
U.S. Sales Only.

Nonlinear U(N) and O(N) sigma-models are studied without imposing a constraint on the modulus of the field vector. Exact solutions in four-dimensional Minkowski space are presented, which have the form of plane or spherical waves. The singularities of the solutions as well as those of the Lagrangian density and the energy-momentum tensor are discussed. All results hold under the assumption that space-time and internal symmetry of freedom are not mixed. (Atomindex citation 11:514914)

WIS-Ph-63/79 PC **A02**/MF **A01**
Weizmann Inst. of Science, Rehovoth (Israel).
Non-Abelian Color Symmetry and the Non-Perturbative Bare Pomeron.
M. Bishari. 1979, 14p
U.S. Sales Only.

A previously proposed approach to connect non-perturbative dynamics with perturbative field theory is applied in the flavor singlet channel. Only a field theory containing a triple gluon vertex is consistent with the observed non-perturbative bare pomeron intercept and abundance of gluon field in a nucleon. This consequence rests solely on non-perturbative information, obtained from measurements at only one length scale. (Atomindex citation 11:512412)

WIS-Ph-70/79 PC **A02**/MF **A01**
Weizmann Inst. of Science, Rehovoth (Israel). Dept. of Physics.
Method for Solving Some Classical Yang Mills Equations.
L. Catillejo, and M. Kugler. 1979, 9p
U.S. Sales Only.

The symmetry of some Yang Mills solutions dictates a natural set of gauge and Lorentz invariant degrees of freedom. In terms of these the Yang Mills equations decompose into a set of simple ordinary differential equations. Some examples are solved. (Atomindex citation 11:511565)

WIS-Ph-79/59 PC **A02**/MF **A01**
Weizmann Inst. of Science, Rehovoth (Israel).
Perturbative and Non-Perturbative Two Component Model of Deep Inelastic Scattering.
M. Bishari. 1979, 12p
U.S. Sales Only.

A two-component model for describing deep inelastic scattering based on non-perturbative and perturbative mechanisms is proposed. The non-perturbative dynamics obey the usual S-matrix constraints, as realized by the Dual Topological Unitarization Scheme, whereas the perturbative component stems from the underlying field theory. However, these two components are not independent. (Atomindex citation 11:512248)

ZJE-227 PC **A04**/MF **A01**
Skoda, Pilsen (Czechoslovakia). Zavod Vystavba Jadernych Elektraren.
BIPAL - A Data Library for Computing the Burnup of Fissionable Isotopes and Products of Their Decay.
E. Kralovcova, J. Hep, and V. Valenta. 1978, 63p
U.S. Sales Only.

The BIPAL databank contains data on 100 heavy metal isotopes starting with exp 206 Tl and finishing with exp 253 Es. Four are stable, the others are unstable. The following data are currently stored in the databank: the serial number and name of isotopes, decay modes and, for stable isotopes, the isotopic abundance (%), numbers of P decays and Q captures, numbers of corresponding final products, branching ratios, half-lives and their units, decay constants, thermal neutron captures, and fission cross sections, and other data (mainly alpha, beta and gamma intensities). The description of data and a printout of the BIPAL library are presented. (Atomindex citation 11:514724)

ZJE-228 PC **A02**/MF **A01**
Skoda, Pilsen (Czechoslovakia). Zavod Vystavba Jadernych Elektraren.
Corrections and Supplements to the Fission Product Data Libraries BIBFP and BIBGRFP.
J. Hep, and V. Valenta. 1978, 23p
U.S. Sales Only.

Corrections and addenda between 1972 and Feb 15, 1977 are presented to the BIBFP library on fission product half-lives. Tabulated data include the names of the isotopes, the value of half-life listed in the BIBFP library, data taken from the Karlsruhe Nuklidkarte and in the CEA-N-1822 report, and the recommended half-life values. (Atomindex citation 11:514723)

20I. Plasma Physics

AD-A090 883/0 PC **A02**/MF **A01**
Texas Univ. at Austin. Dept. of Electrical Engineering.
Effects of Frequency Averaging on Estimates of Plasma Wave Coherence Spectra,
Y. C. Kim, and E. J. Powers. 2 Jul 76, 12p
AFOSR-TR-80-0799
Contract F49620-77-C-0101
Pub. in IEEE Transactions on Plasma Science, vPS-5 n1 p31-40 Mar 77.

No abstract available.

AD-A090 931/7 PC **A03**/MF **A01**
Naval Research Lab., Washington, DC.
Propagation of Relativistic Electron Beams in Current-Carrying Plasma Channels.
Memorandum rept.,
D. P. Bacon, G. Cooperstein, S. A. Goldstein, and I. M. Vitkovitsky. 5 Sep 80, 29p Rept no. NRL-MR-4330

Experimental results of propagating up to 400 kA of relativistic electron beams (approx. 1 MeV) over a distance of 64 cm in a tightly focused mode are reported. Efficient transport (greater than 80%) was observed when a channel of plasma containing enough current to confine the hot electrons was used. Theory of the flow includes return current effects, and is in good agreement with experimental results. The theory is used to predict limits of this technique. (Author)

CEA-CONF-4692 PC **A02**/MF **A01**
Association Euratom-CEA sur la Fusion, Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Dept. de Physique du Plasma et de la Fusion Controlee.
Variational Calculation of the Non-Linear Growth of the Q = 1 Island.
A. Samain, and M. Dubois. 1979, 4p
U.S. Sales Only.

An important problem related to disruptions is the growth rate of the magnetic islands which may develop on the surfaces q = 1, = 2 ... When the island width becomes larger than the resistive layer of the tearing theory, the problem is nonlinear. It has been studied numerically and analytically in the case of small q = 2 islands. The authors of the analytical study assume that the plasma is in equilibrium, then they express that the electric current induced in the vicinity of the island, by the evolution of the magnetic configuration, is consistent with the discontinuity of the magnetic field imposed by the MHD solutions in the outer regions. A similar calculation has been done to study the possibility of magnetic islands due to thermal effects. These calculations use the constant psi approximation and therefore they do not apply as they are to the case of a q = 1 island. Here we will consider this case, using the hypothesis that at each time there exists a well defined separatrix or at least that the change of topology takes place within a layer, thin compared to the island width. Also we assume that the plasma is in equilibrium outside this layer and that the magnetic field is continuous across it. This situation and the generalized Ohm law impose the growth rate, which we obtain by variational methods. (Atomindex citation 11:515439)

CEA-CONF-4693 PC **A02**/MF **A01**
Association Euratom-CEA sur la Fusion, Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Dept. de Physique du Plasma et de la Fusion Controlee.
Heating the Various Plasma Species Via the Proton-Deuteron Hybrid Resonance.
J. Jacquinot. 1979, 4p CONF-790180-1
Topical conference on radio frequency plasma heating, Pasadena, CA, USA, 11 Jan 1979.
U.S. Sales Only.

A series of recent papers has established the idea that even a small amount of hydrogen impurity at fundamental resonance in a deuterium plasma modifies entirely the damping mechanism of the fast magnetosonic wave (FMW). The FMW energy is linearly mode-converted into a slow electrostatic mode (EW) in the ion-ion hybrid resonance layer. The overall damping of the FMW eigen modes can be calculted without knowing the fate of the EW. Obviously, the evaluation of the heating performance requires to know the trajectory and damping of the EW which contain the information on the localisation and heating rate of the various plasma species. Perkins has presented preliminary solutions to this problem. In a Tokamak geometry, he showed the paramount importance of the effects of the finite temperature and the poloidal field component normal to the mode conversion layer. In this paper we consider again the same problem but we include the damping effects of the minority species and the integration of the deposited power in each species along the wave trajectory. Moreover we find necessary to solve the wave equation for an arbitrary magnitude of the damping decrement. (Atomindex citation 11:515342)

CEA-CONF-4710 PC **A02**/MF **A01**
Association Euratom-CEA sur la Fusion, Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Dept. de Physique du Plasma et de la Fusion Controlee.
Possible Importance of Generalized Lorenz Equations in the Theory of Magneto-Hydrodynamic Stability.
E. K. Maschke, and B. Saramito. 1979, 9p
CONF-7906106-5
International workshop on intrinsic stochasticity in plasmas, Cargese, Corsica, France, 18 Jun 1979.
U.S. Sales Only.

The question of the role of strange attractors in MHD turbulence is treated in the case of an interchange-unstable plasma. Using truncated Fourier expansions, generalized Lorenz equations for N amplitudes are derived. Their solutions are investigated numerically up to N = 136, and compared with results from a fluid code. For the generalized Lorenz equations, strange attractors are found, which indicates that the original MHD equations also possess this type of solution. (Atomindex citation 11:515381)

CEA-CONF-4731 PC **A03**/MF **A01**
Association Euratom-CEA sur la Fusion, Centre d'Etudes Nucleaires de Fontenay-aux-Roses (France). Dept. de Physique du Plasma et de la Fusion Controlee.
Equilibrium and Stability in Configurations with Three Dimensional Magnetic Axis.
C. Mercier. 1979, 35p CONF-7909118-1
International conference on hypernuclear and low energy kaon physics, Jablonna, Poland, 11 Sep 1979.
U.S. Sales Only.

The equilibrium and stability of a tube of plasma at a high temperature and with a high density depend on the geometrical shape of the plasma, the magnetic field imposed and the current flowing. However, tubes of plasma can be constructed in equilibrium without a current by employing either a non circular cross section turning along the tube axis (plane stellarators), or configurations twisted in space: this geometrical arrangement was used for the first time by Spitzer with an apparatus having a figure 8 shape in space. The purpose of the studies is to investigate some of the properties of these twisted configurations. (Atomindex citation 11:515386)

COO-3497-40 PC **A02**/MF **A01**
Rochester Univ., NY. Dept. of Mechanical and Aerospace Sciences.
Annual Progress Report.
A. Simon. 31 Aug 80, 18p
Contract AS02-76ET53032

Research efforts were concentrated on two main topics. One was to obtain a fit between single-mode nonlinear saturation theory and experimental observations on the PR-6 mirror device. A model of this experiment yields good agreement between predictions of the time variation of the fluctuating potential level, the floating potential, the mode wavelength and mode frequency, and observations. The second topic concerned single-mode Landau damping. The previous results of O-Neil-Morales were confirmed, but in much simpler form with no multiple sums. No longer-time corrections of any significant size were uncovered. (ERA citation 05:037421)

DOE/ET/53041-12 PC **A02**/MF **A01**
Northwestern Univ., Evanston, IL.
Computer Simulation of Kinetic Properties of Plasmas. Progress Report, July 1, 1979-June 30, 1980.
J. Denavit. 1980, 9p
Contract AC02-76ET53041

The research is directed toward the development and testing of new numerical methods for particle and hybrid simulation of plasmas, and their application to physical problems of current significance to Magnetic Fusion Energy. During the present period, research on the project has been concerned with the following specific problems: (1) Consideration of radial dependence and shear stabilization of drift and dissipative trapped-electron instabilities. (2) Long-time-scale algorithms for particle simulation with omega /sub pe/ delta t much greater than 1. (3) Computer studies of field-reversed ion rings. (ERA citation 05:037396)

IPF-79-3 PC **A02**/MF **A01**
Stuttgart Univ. (Germany, F.R.). Inst. fuer Plasmaforschung.
Absorption of Magnetoacoustic Waves in a High beta Plasma.
F. Moser, E. Raeuchle, E. Schneider, and P. G. Schueller. 1979, 18p
In German.
U.S. Sales Only.

The radial propagation and absorption of magnetoacoustic waves (m = 0, kz z= 0) in a radially inhomogeneous, high beta plasma column of a theta pinch is investigated both theoretically and experimentally. It is shown, that viscosity is the dominant dissipative mechanism. Power absorption up to 10 MW is obtained, which corresponds to an average heating rate of 5 eV/ mu sec per particle. (Atomindex citation 11:511945)

IPF-79-5 PC **A03**/MF **A01**
Stuttgart Univ. (Germany, F.R.). Inst. fuer Plasmaforschung.
Wave Propagation in a Temperate N Ion Species Plasma around the Ion Cyclotron Frequency Range.
G. Janzen. 1979, 26p
U.S. Sales Only.

Plane wave propagation in temperate plasmas consisting of n ion species is calculated analytically for collisionless plasmas of arbitrary composition. Numerical results are given for the complex refractive index of plasmas including collisions between particles of any kind and at arbitrary angles of propagation. There are two waves propagating at all angles other than 90 exp 0 , one wave showing resonance at each of the n cyclotron frequencies of the ions involved. High ion-ion collision frequencies combine the motions of the ions to give new mass and composition weighted hybrid ion cyclotron resonances. At right angles to the external magnetic field one wave will propagate in the ion cyclotron range showing n-1 ion-ion-hybrid resonances and n-1 hybrid cutoffs. The ion-ion-hybrid resonances can be traced down to propagation at angles smaller than 90 exp 0 , disappearing for parallel propagation. The hybrid resonance frequencies are close to the cyclotron frequencies of the ions with small relative concentrations. Damping of the waves in the neighbourhood of the ion-ion-hybrid resonances is strongly affected by ion-ion collisions. (Atomindex citation 11:511904)

IPP-2/246 PC **A03**/MF **A01**
Max-Planck-Inst. fuer Plasmaphysik, Garching (Germany, F.R.).
Cyclotron Emission from an RF-Plasma Generated in Wendelstein VII-A.
A. Cavallo, and M. Tutter. Jun 79, 33p
In German.
U.S. Sales Only.

Emission measurements near the electron cyclotron frequency were made on an rf- generated plasma in Wendelstein VIIA. Contrary to the expected maximum for cyclotron resonance at the torus axis (corresponding to the radial profile of the electron temperature of a thermal plasma) the emission showed a minimum there and very high values far away of the cyclotron resonance. This observation can be understood by the assumption of a small component of high energy runaway elec-

trons, whose radiation is dispersed by the cold main part of the plasma. It is estimated, that the total energy of the runaway electrons is about the same as the energy of the cold plasma. (Atomindex citation 11:511855)

IPP-4/183 PC **A02**/MF **A01**
Max-Planck-Inst. fuer Plasmaphysik, Garching (Germany, F.R.).
Kinetic Theory of Transit Time Magnetic Pumping and Alfven Wave Heating.
S. Puri. Nov 79, 8p
U.S. Sales Only.

Coupling, conversion (from primarily compressional to a mixed torsional/compressional character near the critical Alfven surface), and absorption of Alfven waves in a hot, inhomogeneous plasma is studied using idealized current carrying antennas. Only an insignificant fraction of the energy coupled by the antenna into the compressional wave is delived to the plasma either by wave conversion or through direct transit time attenuation of the compressional wave. (Atomindex citation 11:515426)

IPP-6/187 PC **A03**/MF **A01**
Max-Planck-Inst. fuer Plasmaphysik, Garching (Germany, F.R.).
Stochastic Stability of MHD Equilibria.
J. Teichmann. Jul 79, 39p
U.S. Sales Only.

The stochastic stability in the large of stationary equilibria of ideal and dissipative magnetohydrodynamics under the influence of stationary random fluctuations is studied using the direct Liapunov method. Sufficient and necessary conditions for stability of the linearized Euler-Lagrangian systems are given. The destabilizing effect of stochastic fluctuations is demonstrated. (Atomindex citation 11:512014)

IPPCZ-220 PC **A02**/MF **A01**
Ceskoslovenska Akademie Ved, Prague. Ustav Fyziky Plazmatu.
Radiation Pressure Forces in Cold Magnetized Plasma.
R. Klima, and V. A. Petrzilka. Jan 78, 22p
U.S. Sales Only.

Hydrodynamic equations governing the time-averaged motions of plasma electrons and ions in the presence of oscillating and steady electromagnetic fields are derived. In addition to well-known gradient and collisional terms, new forces arise owing to the time dependence of the field amplitudes. Time-averaged particle flux densities are given. (Atomindex citation 11:511919)

IPPCZ-221 PC **A03**/MF **A01**
Ceskoslovenska Akademie Ved, Prague. Ustav Fyziky Plazmatu.
Dispersion Relation of Charge and Current Compensated Relativistic Electron Beam-Plasma System.
P. Vrba, J. Schroetter, P. Jarosova, and S. Koerbel. Jan 78, 32p
U.S. Sales Only.

The unstable regions of relativistic electron beam-plasma system were determined by analysing the general dispersion relation numerically. The external parameters were varied to ensure more effective instability excitations. The full charge- and current compensation presumptions lead to the new synchronism predictions. The slow space charge wave and slow cyclotron wave of the return current are synchronous with the plasma ion wave. (Atomindex citation 11:512024)

IPPCZ-222 PC **A02**/MF **A01**
Ceskoslovenska Akademie Ved, Prague. Ustav Fyziky Plazmatu.
HF Heating of a Plasma Column at Frequencies Below the Electron Cyclotron Frequency.
J. Datlov, V. Kopecky, J. Musil, F. Zacek, and K. Novik. Feb 78, 23p
U.S. Sales Only.

The dispersion of waves, excited by the helical structure in a plasma column and the heating of a tail of the electron distribution function is studied at frequencies below the electron plasma frequency and the electron cyclotron frequency. (Atomindex citation 11:511863)

LA-8496-MS PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Application of Intense Relativistic Electron Beams to Heating and Confinement of Toroidal Plasma Experiments.
C. A. Ekdahl. Aug 80, 10p
Contract W-7405-ENG-36

Because of recently reported successes in the use of intense relativistic electron beams for heating toroidal plasmas, their application in Los Alamos Scientific Laboratory toroidal z-pinch experiments (ZT-40 and ZT-S) is examined. The conclusion is reached that a modestly sized beam (approx. k$150) could be useful for heating an experiment with the size of ZT-S, but that it would require a much larger beam to significantly effect the bulk temperature of larger experiments, such as ZT-40. (ERA citation 05:037373)

N81-10862/3 PC **A03**/MF **A01**
Centro Informazioni Studi Esperienze, Milan (Italy). Documentation Service.
A Computer Code for the Spectroscopic Study of Laser Produced Plasmas.
L. Garifo. Jun 79, 31p CISE-1501
Contract CNR-77-01520.11

The SPECT code for the calculation of relative ion densities in a laser produced plasma is described. The algorithm used is stable and reasonably accurate, also with large integration steps. The code is therefore suitable to be coupled to another code which describes the hydrodynamical behavior of the plasma. Results are shown for a carbon plasma and a beryllium plasma.

N81-10863/1 PC **A05**/MF **A01**
Paris-Sud Univ., Orsay (France). Lab. de Physique des Plasmas.
Radial Distribution of the Electron Density and the Excited Atoms Density in a Plasma Column, Produced by a Surface Wave Distribution Radiale de la Densite Electronique et de la Densite des Atomes Excites dans Une Colonne de Plasma Produite Par Une Onde de Surface.
M. Moisan, R. Pantel, A. Ricard, V. M. M. Glaude, and P. Leprince. Jan 80, 77p LP-176
In French; English Summary.

The radial distribution of excited atoms in an Argon plasma, produced by a surface wave was determined. The measurements were made by recording both emission and absorption at a given wavelength as a function of the radius. Depending on the neutral gas pressure (50 to 350 mTorr) and on the surface wave frequency, the radial distribution is either flat or has a minimum on the axis and a maximum near the tube wall. A theoretical explanation is given. The same radial dependence occurs for the density of a metastable level. The radial distribution of the electrons is estimated assuming ambipolar diffusion.

PPPL-1686 PC **A02**/MF **A01**
Princeton Univ., NJ. Plasma Physics Lab.
Stark Broadening of Isolated Lines from High-Z Emitters in Dense Plasmas.
J. C. Weisheit, and E. L. Pollock. Sep 80, 18p
CONF-800768-1
Contract AM02-76CH03073
International conference on spectral line shapes, Berlin, F.R. Germany, 7 Jul 1980.

The joint distribution of the electric microfield and its longitudinal derivative is required for the calculation of line profiles for the He-like ions in very dense plasmas. We used a molecular dynamics code to compute exact distributions in single- and multi-component plasmas, and then we investigated various analytical approximations to these results. We found that a simplified, two-nearest-neighbor scheme leads to surprisingly accurate distribution functions. Our results are illustrated by sample profiles for Ne exp +8 and Ar exp +16 resonance lines. (ERA citation 05:037390)

PPPL-1690 PC **A02**/MF **A01**
Princeton Univ., NJ. Plasma Physics Lab.
Plasma Density Measurements Using FM-CW Millimeter Wave Radar Techniques.
J. L. Doane, E. Mazzucato, and G. L. Schmidt. Sep 80, 20p
Contract AM02-76CH03073

Modified FM-CW radar techniques using swept millimeter-wave oscillators are useful for determining when a particular density has been reached in a plasma. Narrowband measurements on the Princeton Large Torus (PLT) demonstrate the suitability of these techniques for controlling high-power auxiliary plasma heating systems. Broadband measurements using these same techniques are proposed, by which the density profile could be determined. (ERA citation 05:037387)

PPPL-1702 PC **A02**/MF **A01**
Princeton Univ., NJ. Plasma Physics Lab.
Maxwell-Vlasov Equations as a Continuous Hamiltonian System.
P. J. Morrison. Sep 80, 13p
Contract AM02-76CH03073

The well-known Maxwell-Vlasov equations that describe a collisionless plasma are cast into Hamiltonian form. The dynamical variables are the physical although noncanonical variables E, B and f. We present a Poisson bracket which acts on these variables and the energy functional to produce the equations of motion. (ERA citation 05:035799)

Rijnhuizen-79-119 PC **A04**/MF **A01**
Stichting voor Fundamenteel Onderzoek der Materie, Jutphaas (Netherlands). Inst. voor Plasma-Fysica.
Low-Frequency Modes with High Toroidal Mode Numbers. A General Formulation.
F. Pegoraro, and T. J. Schep. Sep 79, 62p
U.S. Sales Only.

Low-frequency waves with high toroidal mode numbers in an axisymmetric toroidal configuration are studied. In particular, the relationship between the periodicity constraints imposed by the geometry, magnetic shear and the spatial structure of eigenmodes is investigated. By exploiting the radial translational invariance and the poloidal periodicity of the gyrokinetic and Maxwell equations, the two-dimensional problem can be converted into a one-dimensional one and the mode structure can be expressed in terms of a single extended poloidal variable. This representation is used in the description of electromagnetic modes with phase velocities larger than the ion thermal velocity and with frequencies below the ion gyro-frequency. Trapped particle, curvature and compressional effects are retained. The dispersion equations for drift mode and Alfven-type modes are given in general geometry and simplified solutions are presented in the configuration of a double periodic plane slab. (Atomindex citation 11:511960)

Rijnhuizen-79-121 PC **A02**/MF **A01**
Stichting voor Fundamenteel Onderzoek der Materie, Jutphaas (Netherlands). Inst. voor Plasma-Fysica.
Ideal MHD Equilibrium of a Weakly Toroidal Plasma with Elongated Cross-Section. I. Elliptic Cross-Section.
W. Schuurman, and E. J. M. van Heesch. Oct 79, 19p
U.S. Sales Only.

Analytic solutions are constructed of the ideal MHD equations describing the equilibrium of a toroidal plasma with an elliptic cross-section and surrounded by vacuum. The method used is a series expansion in the inverse aspect ratio. Toroidal effects are amongst others the appearance of a toroidal surface current and a shift of the stagnation points in the vacuum towards the major axis of the torus. The demand of negligible second-order effects excludes the appearance of a second magnetic axis or any other equilibrium limit on beta . With a metal wall placed arbitrarily on one of the flux surfaces in the vacuum, a formula is derived for the toroidal shift of the plasma column as a function of the comprression ratio, the poloidal beta and the ellipticity. Numerical examples show that for high compression ratios the toroidal shift decreases considerably if the ellipticity is increased. At low values of the compression ratio however, there exists a critical ellipticity where the toroidal displacement has a minimum. (Atomindex citation 11:511989)

UCID-17530(Rev.1) PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Computational Physics Program of the National MFE Computer Center.
A. A. Mirin. Aug 80, 35p
Contract W-7405-ENG-48

The computational physics group is involved in several areas of fusion research. One main area is the application of multidimensional Fokker-Planck, transport and combined Fokker-Planck/transport codes to both toroidal and mirror devices. Another major area is the investigation of linear and nonlinear resistive magnetohydrodynamics in two and three dimensions, with applications to all types of fusion studies, investigations of more efficient numerical algorithms are being carried out. (ERA citation 05:035802)

UCID-18486 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Microwave Heating of Hot, Overdense Plasmas.
K. R. Eppley. 4 Dec 79, 24p
Contract W-7405-ENG-48

Calculations were made of the heating of hot (approx. 5 keV), overdense (10 exp 8 critical density) deuterium plasmas by 1 cm microwaves with an incident power of 5 x 10 exp 16 watts/cm exp 2 . Dependence of the heating rate on the plasma temperature and the drift velocity of the surface was also studied. The power absorption is found to vary approximately as T/sup 1/2/. (ERA citation 05:037375)

UCRL-Trans-11614 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
MHD Plasma Stability in High Mirror Ratio Open Traps.
D. D. Ryutov, and G. V. Stupakov. 29 Jul 80, 25p
Contract W-7405-ENG-48
Translation of Russian Journal Preprint 8--130.

On the basis of graphic considerations, Section 2 estimates the perturbation of plasma magnetic energy and finds the conditions under which a high mirror ratio actually leads to a decrease in beta / sub crit/. With allowance for these results, Section 3 makes a formal minimization of the system's total potential energy and finds the equation for the eigenfunctions of the most dangerous perturbations. This equation is solved in Section 4, where, as a result, simple analytic formulas are derived for beta /sub crit/. (ERA citation 05:037416)

20J. Quantum Theory

IPNO-TH-79-25 PC **A03**/MF **A01**
Paris-11 Univ., Orsay (France). Inst. de Physique Nucleaire.
Position Variables in Classical Relativistic Hamiltonian Mechanics.
H. Sazdjian. May 79, 35p
U.S. Sales Only.

Poincare invariant and covariant systems of two scalar particles interacting at a distance are constructed within the equal-time Hamiltonian formalism of classical relativistic mechanics. Position variables are constructed in terms of the canonical variables of the theory by demanding that they transform under the Lorentz transformations as the space components of four-vectors. The possibility of identifying position variables with canonical coordinates in the center-of-momentum frame is shown. In that particular frame equations of motion take a simple form and can be solved as in nonrelativistic mechanics. A velocity always smaller than that of light is ensured for each particle in the case of a large variety of relativistic potentials which reduce in the non-relativistic limit to the usual central potentials. The present approach is similar to that adopted earlier by Pauri and Prosperi; it differs however by the additional requirement of manifest covariance of the underlying theory. (Atomindex citation 11:511616)

LA-UR-80-2437 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Statistical Mechanics of Solitons.
A. Bishop. 1980, 19p CONF-800857-1
Contract W-7405-ENG-36
Physics in one-dimension conference, Fribourg, Switzerland, 25 Aug 1980.

The status of statistical mechanics theory (classical and quantum, statics and dynamics) is reviewed for 1-D soliton or solitary-wave-bearing systems. Primary attention is given to (i) perspective for existing results with evaluation and representative literature guide; (ii) motivation and status report for remaining problems; (iii) discussion of connections with other 1-D topics. (ERA citation 05:035783)

NBI-HE-79-32 PC **A04**/MF **A01**
Niels Bohr Inst., Copenhagen (Denmark).
Geometric Theory of Local and Nonlocal Conservation Laws for the Sine-Gordon Equation.
R. Sasaki, and R. K. Bullough. 1979, 65p
U.S. Sales Only.

In previous work one of the authors gave a geometric theory of those nonlinear evolution equations which can be solved by the Zakharov and Shabat (1972) inverse scattering scheme as generalized by Ablowitz, Kaup, Newell and Segur (1973,1974). In this paper the authors extend the geometric theory to include the Hamiltonian structure of those NEEs solvable by the method, and indicate the connection between the geometric theory and the theory of prolongation structures and pseudopotentials due to Wahlquist and Estabrook (1975,1976). They exploit a 'gauge' invariance of the geometric theory to derive both the well-known polynomial conserved densities of the sine-Gordon equation and a non-local set of conserved densities which act as Hamiltonian densities for a hierarchy of sine-Gordon equations analogous to that found by Lax (1968) for the Korteweg-de Vries equation and which appears to be new. In an appendix an expression is derived for the equation of motion for an arbitrary member of the sine-Gordon hierarchy by methods which can be applied in larger context. (Atomindex citation 11:514942)

PB81-115008 PC **A03**/MF **A01**
Deutsches Elektronen-Synchrotron, Hamburg (Germany, F.R.).
High Temperature Expansions for the Free Energy of Vorticies Respectively the String Tension in Lattice Gauge Theories.
Gernot Muenster. May 80, 28p DESY-80/44

High temperture cluster expansions are derived for the free energy of vortices in SU(2) and Z2 lattice gauge theories in 3 and 4 dimensions. The expected behavior of the vortex free energy is verified. It obeys an area law behavior. The coefficient of the area is shown to be equal to the string tension between static quarks. Its expansion is calculated up to the 12th order. For SU(2) in 4 dimensions, the result is compared with Monte Carlo calculations of Creutz and is in good agreement at strong and intermediate coupling.

UNI-GRAZ-UTP-07-79 PC **A03**/MF **A01**
Graz Univ. (Austria). Inst. fuer Theoretische Physik.
Two-Body Scattering for Schroedinger Operators Involving Zero-Range Interactions.
F. Gesztesy, and L. Pittner. May 79, 32p
U.S. Sales Only.

The authors show existence and completeness of the Moeller operators for Schroedinger operators involving an ordinary short-range potential and an additional contact interaction which is restricted to a set of Lebesgue measure zero. (Atomindex citation 11:514861)

20K. Solid Mechanics

AD-A091 038/0 PC **A02**/MF **A01**
Delaware Univ., Newark. Applied Mathematics Inst.
Shock Models with Phase Type Survival and Shock Resistance.
Interim rept.,
Marcel F. Neuts, and Manish C. Bhattacharjee.
Aug 80, 14p TR-61B, AFOSR-TR-80-0990
Grant AFOSR-77-3236
Prepared in cooperation with Indian Inst. of Management, Calcutta (India). Sponsored in part by Grant NSF-ENG-79-08351.

New closure theorems for shock models in reliability theory are presented. If the number of shocks to failure and the times between the arrivals of shocks have probability distributions of phase type, then so has the time to failure. PH-distributions are highly versatile and may be used to model many qualitative features of practical interest. They are also well-suited for algorithmic implementation. The computational aspects of our results are discussed in some detail. (Author)

AD-A091 179/2 PC **A02**/MF **A01**
California Univ., San Diego, La Jolla. Dept. of Chemistry.
Brownian Motion of Harmonic Systems with Fluctuating Parameters. I. Exact First and Second Order Statistics of a Mechanical Oscillator,
Bruce J. West, Katja Lindenberg, and V. Seshadri. 19 Dec 79, 20p
Contract N00014-78-C-0497
Pub. in Physica, v102A p470-488 1980.

No abstract available.

AD-A091 284/0 PC **A02**/MF **A01**
David W Taylor Naval Ship Research and Development Center Annapolis MD Propulsion and Auxiliary Systems Dept
Compressional Damping in Three-Layer Beams Incorporating Nearly Incompressible Viscoelastic Cores.
Research and development rept.,
Bruce Edward Douglas. Oct 80, 25p Rept no. DTNSRDC/PAS-80/26

The transverse free mechanical impedance response of an elastic-viscoelastic-elastic beam incorporating the compressional damping mechanism is considered. The work of Douglas and Yang is extended to include shear deformation and rotary inertia in the elastic layers. The effects of nearly incompressible viscoelastic damping cores on the compressional frequency, and hence on the spectral range of damping effectiveness for the composite, is also discussed. Results of the analysis are shown to compare favorably with experimental results for a damped three-layer beam which was optimized for compressional damping and in which the influence of the shear damping mechanism was intentionally minimized. (Author)

AD-A091 298/0 PC **A03**/MF **A01**
California Inst. of Tech., Pasadena. Div. of Engineering and Applied Science.
On Singular Problems in Linearized and Finite Elastostatics.
Technical rept.,
Eli Sternberg. Aug 80, 34p Rept no. TR-45
Contract N00014-75-C-0196

The predictions of linear elasticity theory for various basic types of singular equilibrium problems are illustrated and issues associated with such solutions are discussed. Attention is then turned to recent studies concerning the implications of finite elastostatics for certain singular problems, including some that have no counterpart in the linearized theory. (Author)

AD-A091 315/2 PC **A03**/MF **A01**
California Inst. of Tech., Pasadena. Div. of Engineering and Applied Science.
A Note on the Energy Release Rate in Quasi-Static Elastic Crack Propagation.
Technical rept.,
James K. Knowles. Aug 80, 26p Rept no. TR-46
Contract N00014-75-C-0196

This paper considers analytical issues associated with the notion of the energy release rate in quasi-static elastic crack propagation. When a crack in a deformed elastic solid lengthens, the new free surface created requires energy for its formation. If the crack propagation process is slow enough to be treated as a quasi-static, continuum mechanical models permit the calculation of the rate at which energy is made available for the generation of new

free surface in terms of the solution of the governing equilibrium problem corresponding to the deformation of the cracked solid under given loads.

AD-A091 397/0 Not available NTIS
Battelle Columbus Labs., OH.
Response: Discussion of 'J Integral Analysis of Stable Crack Growth',
I.-H. Lin, J. P. Hirth, and A. R. Rosenfield. 10 Jun 80, 6p ARO-15689.5-MS
Contract DAAG29-78-C-0031
Availability: Pub. in International Jnl. of Fracture, v16 pR157-R161 1980 (No copies furnished by DTIC/NTIS).

No abstract available.

N81-10456/4 PC **A04**/MF **A01**
National Research Council of Canada, Ottawa (Ontario).
The Solution of Fracture Mechanics Problems Existing with Finite Element Programs.
J. J. Kacprzynski. 27 May 80, 71p LTR-ST-1178
Presented at Ttcp Meeting, Ottawa, Aug. 1980.

The finite element method is the best method available for the numerical and most of the engineering fracture mechanics problems. The finite elements programs do not give the exact results, they are idealization dependent and in fracture mechanics, dealing with singular stress/displacement fields, the effect of idealization is particularly strong. There is no direct method for the evaluation of the accuracy of the finite element calculation. Intuition or experience may help in the proper idealization of the problem, but it can be verified only by calculation performed with different idealization. In a case of enriched elements, it appears that there is an 'ideal' size (not extremely large or extremely small) for a given fracture problem.

N81-10467/1 PC **A03**/MF**A01**E
Royal Netherlands Aircraft Factories Fokker, Schiphol-Oost. Space Dept.
Numerical Buckling Analysis of a Z-Stiffened Panel Model with the Experimental Method Fokker (Emf) and BOSOR4 Computer Programs.
B. H. Bulder. 21 Mar 79, 28p FOK-RV-79-33

Results are reported for two numerical buckling analyses to correlate the BOSOR4 R = infinity option, for flat panel buckling, with a manufacturer-developed collapse load code, for a Z-type stringer-skin model. Good correlation was found for general instability. Results are given for elastic buckling load reduction, due to local buckling effects as computed using the manufacturer's procedures.

PB81-114423 PC **A03**/MF **A01**
Sydney Univ. (Australia). Civil Engineering Labs.
Inplane Stability of Parabolic Arches.
Research rept.,
H. B. Harrison. Apr 80, 27p R-363

Some numerical studies are reported of the response to uniformly distributed loading of parabolic arches of rise equal to a fourth of the span. Base conditions are both fixed and pinned. The distributed loading varies between covering less than half the span to covering the complete span. The numerical studies use a discrete element, large deformation method that enables the prediction of the complete load-deformation history of an elastic arch up to full inversion if necessary. Account is taken of axial as well as flexoral strains and, under full span loading published data are confirmed for the load intensities at which equilibrium bifurcation occurs. The significant result, however, is that the intensity of load that can be supported by a fully elastic arch is significantly less than the bifurcation value when approximately three-fourths of the span is loaded. The reduction in load intensity is appreciable for both fixed and pinned arches.

PB81-114431 PC **A02**/MF **A01**
Sydney Univ. (Australia). Civil Engineering Labs.
Multiple Column Curves by Modifying Factors.
Research rept.,
J. M. Rotter. May 80, 14p R-366

There are two principal disadvantages in the use of multiple column curves as they are currently formulated. First, they are represented either by equations which are cumbersome to use or by tables with a new table for each column curve. Second, the change from one column curve to another is a large step change so that it may be difficult to decide which curve should represent some sections and it is possible for anomalies to arise. These two disadvantages are removed in the proposed method, in which the three SSRC curves are represented by a single curve and a single linear modifying function. The modifying function has been chosen to allow smooth transitions between the existing SSRC curves and to make step changes between the curves unnecessary.

PB81-114787 PC **A08**/MF **A01**
Brown, Boveri und Cie A.G., Mannheim (Germany, F.R.).
SUPERNET Generierungsprogramm fur Finite Elemente Benutzer-Handbuch,
K. E. Buck, U. Von Bodisco, and K. Winkler. Feb 80, 158p KFK-CAD-149
Text in German.

The program system SUPERNET consists of a pre-processor for the generation of complete input data, and a post-processor for the presentation of results of general finite element calculations. The present report contains the user documentation for the preprocessor. Following a survey of the aims and general principles, the different features of the program are described. The application is illustrated by a small number of examples.

PB81-115628 PC **A05**/MF **A01**
Southampton Univ. (England). Inst. of Sound and Vibration Research.
The Modelling of Structural Systems and Signals for Machinery Condition Monitoring Studies.
Technical rept.,
M. F. White. Dec 77, 94p ISVR-TR-97

A continuous system model is used to represent a high modal density structure such as a typical machine of complex design. Frequency response characteristics are examined in order to investigate their effects on signal transmission, and the transfer function evaluated at high frequency is compared with experimental data. Test signals simulating machinery fault waveforms are used to excite the system model and the effect of transfer characteristics is evaluated using both spectral and statistical analysis techniques. A method of inverse transformation is considered which enables signals from components within a machine to be related to the excitation force with the aid of the system transfer function.

20L. Solid-State Physics

AD-A090 815/2 PC **A02**/MF **A01**
Colorado State Univ., Fort Collins. Dept. of Electrical Engineering.
Remote Polar Phonon Scattering in Si Inversion Layers.
Technical rept.,
B. T. Moore, and D. K. Ferry. 19 Nov 79, 5p Rept no. TR-N-80-3
Contract N00014-78-C-0124
Pub. in Jnl. of Applied Physics, v51 n5 p2603-2605 May 80.

No abstract available.

AD-A090 976/2 PC **A03**/MF **A01**
Harry Diamond Labs., Adelphi, MD.
Optical Spectra of Yb3+ in Crystals with Scheelite Structure. II. Crystal-Field Calculations and a Phenomenological Crystal-Field Model.
Technical rept.,
Edward A. Brown. Sep 80, 38p Rept no. HDL-TR-1934

In a previous report we presented the results of a series of measurements of the optical and Zeeman spectra of trivalent ytterbium doped into the following members of the scheelite family of crystalline hosts: cadmium molybdate (CdMoO4), calcium tungstate (CaWO4), calcium molybdate (CaMoO4), strontium tungstate (SrWO4), strontium molybdate (SrMoO4), lead tungstate (PbWO4), lead molybdate (PbMoO4), barium tungstate (BaWO4), and lithium yttrium fluoride (LiYF4). Measurements were made at temperatures varying from below the lambda point of liquid helium up to room temperature on samples with impurity ion concentrations varying from 0.05 to 4.0 percent Yb. The results were the identification of the electronic transitions, both absorption and fluorescence, and the measurement of the g factors of the lowest J = 5/2 state. The objective of this report is to take these experimental results and from them derive a self-consistent set of crystal-field parameters. Following this calculation, using the conventional approach of the electrostatic point charge model, we calculate a similar set of crystal-field parameters to compare with the experimentally determined ones.

AD-A091 019/0 PC **A02**/MF **A01**
Northwestern Univ., Evanston, IL. Dept. of Physics and Astronomy.
Self-Consistent Electronic Band Structure of Chevrel Phase Compounds,
T. Jarlborg, and A. J. Freeman. 1980, 6p
AFOSR-TR-80-0973
Grants AFOSR-76-2948, NSF-DMR77-23776
Pub. in Superconductivity in d- and f- Band Metals, p521-525 1980.

No abstract available.

AD-A091 252/7 PC **A04**/MF **A01**
Harry Diamond Labs., Adelphi, MD.
Optical Spectra of Yb(3+) in Crystals with Scheelite Structure. I. Explanation of the Spectra.
Technical rept.,
Edward A. Brown. Sep 80, 54p Rept no. HDL-TR-1932
See also AD-A090 976.

The optical and Zeeman spectra are reported for Yb(3+) in nine single crystals of the Scheelite family at temperatures varying between 1.9 and 300 K and impurity ion concentration varying between 0.05 and 4 percent. The scheelite crystals examined were CaWO4, CaMoO4, SrWO4, SrMoO4, PbWO4, PbMOO4, CdMoO4, BaWO4, and LiYF4. The Yb(3+) ion substitutes for the cation and experiences a crystalline electric field of S4 point symmetry. The spectra were found to be highly structured containing the S4 electronic transitions, concentration dependent lines originating from low symmetry sites caused by lattice defects, and features tentatively identified as vibronic transitions. Vibronic selection rules for Yb(3+) in scheelite, which belongs to the C(6)4h space group, have been calculated. Identification of the S4 spectral lines allowed the energy level schemes for Yb(3+) in the nine scheelites to be determined. (author)

AD-A091 304/6 PC **A03**/MF **A01**
Rockwell International, Thousand Oaks, CA. Electronics Research Center.
GaAs Surface Passivation for Device Applications.
Interim rept. no. 3, 3 Dec 79-31 Mar 80,
R. W. Grant, J. R. Oliver, S. P. Kowalczyk, J. R. Waldrop, and D. L. Miller. Jul 80, 32p
ERC41051.151RT, AFWAL-TR-80-1104
Contract F33615-78-C-1591

Three samples of MBE grown graded Al(1-x)Ga(x)As epitaxial layers on GaAs have been prepared. The initial oxidation procedure used on these samples produced only a superficial oxide layer as determined by SAM analysis. C-V and G-V results have been obtained for the initial oxidized specimens and for a specimen of sample 411 which was given a subsequent additional oxidation treatment. During the next reporting period a systematic C-V study as a function of oxidation conditions will be carried out. An initial attempt to deposite an aluminum oxide layer by evaporating Al in an oxidizing atmosphere was unsuccessful which suggests that a much more oxidizing ambient (perhaps a plasma discharge) needs to be utilized if this approach is to be pursued. (Author)

AD-A091 310/3 PC **A08**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH.

The Mobility, Resistivity and Carrier Density in p-Type Silicon Doped with Boron, Gallium and Indium.
Doctoral thesis,
Luis Carlos Linares. Aug 79, 172p Rept no. AFIT-CI-79-232D

The goal of this study has been to measure and compare with theory the resistivity and Hall mobility of holes in silicon doped with gallium and indium as functions of temperature and dopant density. Data taken on boron-doped silicon was also included in order to further confirm the adequacy of the theoretical model. In order to determine theoretically the resistivity and Hall mobility, one must first calculate the conductivity mobility, the density of holes, and the Hall factor. This can only be done with a thorough understanding of the energy band structure, the scattering mechanisms involved, and the carrier statistics. The application of an electric or a magnetic field to a crystal results in a variety of carrier transport phenomena. These phenomena are associated with the motion of current carriers in the conduction or valence bands. The free charge carrier in a semiconductor will acquire a drift velocity under the influence of an applied electric field. This velocity is the net result of the momentum gained from the externally applied field, and the momentum lost in collisions which tend to randomize the carrier momentum.

FRNC-TH-868 PC **A06**/MF **A01**
Paris-6 Univ. (France).
Crystal Field Symmetry and Magnetic Interactions in Rare Earth-Silver Amorphous Alloys.
C. Pappa. 1979, 125p
In French.Thesis.
U.S. Sales Only.

A study has been made of the following rare earth based amorphous alloys: Nd/sub x/Ag/sub 100-x/, Pr/sub x/Ag/sub 100-x/, Gd/sub x/Ag/sub 100-x/, Tl/sub x/Ag/sub 100-x/. In rare earth based amorphous alloys, the symmetrical distribution of the crystal field is very wide and hence not very sensitive to the content of the alloys. The existence of preponderant negative magnetic interactions leads to an upset magnetic order, the magnetization of a small volume not being nil. The magnetic behaviour of alloys with a small concentration of rare earths is governed by the existence of clusters of statistical origin, within which a rare earth ion has at least one other rare earth ion in the position of first neighbour. The presence of a high anisotropy at low temperatures make the magnetic interactions between clusters inoperative. (Atomindex citation 11:519201)

INIS-mf-5657 PC **A06**/MF **A01**
Technische Hogeschool, Delft (Netherlands).
Domain Wall Motion and Magnetization Reversal Processes in a FeSi Picture Frame Single Crystal Studied by the Time-Dependent Neutron Depolarization Technique.
F. J. van Schaik. 18 Oct 79, 112p
Thesis.
U.S. Sales Only.

The three dimensional neutron depolarization technique, which gives detailed information about the static properties of ferromagnetic materials, has been extended to a method by means of which the time dependence of magnetic phenomena can be studied. The measurement of the neutron depolarization against time is made possible by applying a periodical magnetic field on the investigated specimen and by continuous sampling of the transmitted neutron intensity in time channels, which are started synchronously with the applied field. The technique has been used in the study of the magnetic domain structure at room temperature of a (010) (001) picture frame FeSi single crystal (3.5 wt.% Si) with outer dimensions of (15 x 10 x 0.26) mm and a frame width of 2.78 mm. (Atomindex citation 11:519215)

IPNO-PhN-79-08 PC **A02**/MF **A01**
Paris-11 Univ., Orsay (France). Inst. de Physique Nucleaire.
Impurity-Defect Interaction and Diffusion in In-Implanted Nickel.
A. Traverse, L. Thome, L. Brossard, and C. Cohen. 1979, 7p
U.S. Sales Only.

Rutherford backscattering and time-differential perturbed angular correlation experiments were performed on In-implanted nickel foil annealed up to 900 K. The impurity-damage interaction is shown to anneal out just at (or very slightly below) the In diffusion temperature. (Atomindex citation 11:511818)

N81-10877/1 PC **A08**/MF **A01**
Fraunhofer-Gesellschaft zur Foerderung der Angewandten Forschung e. V., Freiburg (Germany, F.R.). Inst. fuer Angewandie Festkoerperphysik.
Trap Analysis in Semiconductors with the Correlation Method.
Final Report.
M. Schulz, H. Lefevre, and F. Pohl. Dec 79, 170p BMFT-FB-T-79-117
In German; English Summary. Sponsored by Bundesmin. Fuer Forsch. U. Technol.

A Deep Level Transient Spectroscopy (DLTS) method with a high trap detection sensitivity (resolution better than 10 to the 10th power traps per cu cm is described. A double electronic correlation is performed on the measured transient capacitance. It is possible to determine trap profiles separately for each level. More than three hundred trap spectra were measured. A large number of levels were determined for neutron transmutation-doped silicon after radiation damage annealing. Defect centers were found in electron irradiated silicon. Deep crystals were analyzed to determine characteristic levels of specific contaminants. Doping profiles were determined for GaAs on epitaxial material. It was possible to distinguish between grown-in defects and interface contaminants.

N81-10879/7 PC **A05**/MF **A01**
Laboratoires d'Electronique et de Physique Appliquee, Limeil-Brevannes (France).
Study of Growth Conditions and Electronic Properties of Double GaAlAs Heterojunctions Prepared in the Vapor Phase for Optoelectronic Applications Etude des Conditions de Croissance et des Proprietes Electroniques des Doubles Heterojunctions au GaAlAs Elaborees en Phase Vapeur pour Applications Optoelectroniques.
Final Report.
J. P. Andre, and J. Hallais. 6 Jul 79, 76p LEP-79.522-SME-555-B
Contract DGRST-77-7-0952
Text in French.

Electroluminescence techniques were employed to investigate the variations in electronic quality with growth conditions. The quality of GaAs prepared with organometals was found to be little dependent on growth conditions. The quality of the GaAlAs produced was found to be highly dependent on growth conditions. Growth conditions were defined to produce high quality GaAlAs high depositing temperature; high group 5/group 3 element ratio; n-type doping with selenium; and p-type with zinc. These criteria enabled double electroluminescent heterojunctions to be realized.

PB81-120529 Not available NTIS
National Bureau of Standards, Washington, DC.
RPA Theory of Magnetic Excitation in Rare Earth-Transition Metal Compounds: Application to ErCo2 and ErFe2.
Final rept.,
N. C. Koon, and J. J. Rhyne. 1980, 2p
Pub. in Jnl. of Magn. Magn. Mater. 15-18, p349-350 1980.

The magnetic excitation spectrum and neutron scattering intensities appropriate to the Laves phase compounds ErCo2 and ErFe2 were calculated, using standard basis operator Greens functions in the random phase approximation. The results are in excellent agreement with recent neutron inelastic scattering data.

20M. Thermodynamics

AD-A090 863/2 Not available NTIS
Texas Inst. for Computational Mechanics, Austin.
Convection-Diffusion Using Finite Element Methods,
G. F. Carey, and T. Plover. 1980, 8p ARO-16207.11-GS
Contract DAAG29-79-C-0081
Availability: Pub. in Proceedings of the 1980 Heat Transfer and Fluid Mechanics Institute, p167-172 1980 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A090 864/0 Not available NTIS
Texas Inst. for Computational Mechanics, Austin.
An Analysis of Stability and Oscillations in Convection-Diffusion Computations,
C. F. Carey. 1979, 11p ARO-16207.3-GS
Contract DAAG29-79-C-0081
Availability: Pub. in Finite Element Methods for Convection Dominated Flows, AMD, v34 p63-71 n.d. (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A091 003/4 Not available NTIS
Carnegie-Mellon Univ., Pittsburgh, PA.
Are Adobe Walls Optical Phase-Shift Filters.
C. V. Coffman, R. J. Duffin, and G. P. Knowles. 1980, 18p ARO-13966.9-M
Grants DAAG29-77-G-0024, NSF-MCS77-03643
Sponsored in part by Grant NSF-MCS78-25526. Presented at the International Symposium on Mathematical Programming (10th), Montreal (Canada), 27-31 Aug 79.
Availability: Pub. in Advances in Applied Mathematics, v1 p50-66 1980 (No copies furnished by DTIC/NTIS).

No abstract available.

20N. Wave Propagation

AD-A090 850/9 PC **A18**/MF **A01**
Advisory Group for Aerospace Research and Development, Neuilly-sur-Seine (France).
Propagation Effects in Space/Earth Paths.
Conference proceedings,
H. J. Albrecht. Aug 80, 403p Rept no. AGARD-CP-284
Presented at the Electromagnetic Wave Propagation Panel Symposium Held in London, 12-16 May 80.

Contents: General Tropospheric Effects, Experimental Data of SHF/EHF Paths, Remote Sensing, General Ionospheric Dispersion Effects, New Data on Ionospheric Irregularities, and Propagation Limitations in Systems.

AD-A091 027/3 PC **A03**/MF **A01**
Naval Surface Weapons Center, Silver Spring, MD.
Calculation of Electromagnetic Scattering by a Perfect Conductor.
Interim rept. FY 80,
A. K. Aziz, M. R. Dorr, and R. B. Kellogg. 5 Jun 80, 29p Rept no. NSWC/TR-80-245

An electromagnetic wave of given shape and frequency falls on a perfectly conducting body or collection of bodies. It is desired to calculate the resulting field. A new method is presented for the numerical solution of this problem, a computer program implementing the method is described, and the results of some numerical calculations are given. (Author)

AD-A091 091/9 MF **A01**
Rome Air Development Center, Griffiss AFB, NY.
VLF/LF Reflectivity of the Polar Ionosphere 6 May-1 September 1979,
Robert P. Pagliarulo, John P. Turtle, John E. Rasmussen, Robert L. Cooley, and Wayne I. Klemetti. Jan 80, 85p Rept no. RADC-TR-80-12
Availability: Microfiche copies only.

This report provides a summary of high latitude ionospheric reflectivity as observed by the USAF high resolution VLF/LF ionosounder operating in northern Greenland. Ionospheric reflectivity parameters, including reflection heights and coefficients, are presented as a function of time of day.

Measurements of polar propagation environment by a magnetometer and a riometer are presented as supplementary data. (Author)

21.

PROPULSION AND FUELS

21B. Combustion and Ignition

AD-A091 000/0 Not available NTIS
TRW Defense and Space Systems Group, Redondo Beach, CA. Engineering Sciences Lab.
Nonisobaric Flame Propagation,
George F. Carrier, Francis E. Fendell, and Philip S. Feldman. 1979, 21p ARO-15048.5-E
Contracts DAAG29-77-C-0032, E(04-3)-1261
Prepared in cooperation with Harvard Univ., Cambridge, MA., Div. of Applied Sciences. Sponsored in part by Grant NSF-MCS78-07598. Errata sheet inserted.
Availability: Pub. in Proceedings of an Advanced Seminar, MRC-44 p333-351, 22-24 Oct 79 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A091 386/3 PC **A03**/MF **A01**
Indiana Univ. at Bloomington. Dept. of Chemistry.
Effects of Gas Composition and Flame Sheathing on the Spatial Velocity Profiles of Laminar Analytical Acetylene Flames.
Technical rept.,
R. E. Russo, and G. M. Hieftje. 2 Oct 80, 32p
Rept nos. TR-29, 36
Contract N00014-76-C-0838

A recently developed technique has been employed to map the spatial rise velocity profiles (horizontal and vertical) of commonly used laminar analytical flames and to determine the influence on the profiles of fuel-to-oxidant ratio and the presence of a flame sheath. The rise velocities for fuel-rich, lean, and stoichiometric flames were found to differ substantially, the entire profile being greatest for the fuel-rich condition and lowest for the fuel-lean flame. In addition, the change in rise velocity with the addition of a solid (quartz tube) or gas (N2) sheath was studied. The following sheath, at several different flow rates, affected each rise velocity profile principally by altering atmospheric entrainment and thereby changing secondary combustion in the flame. In contrast, a solid quartz tube used as a sheath produces an additional increase in the entire velocity profile of each flame, since it constrains gas expansion to the direction of flame propagation. The degree to which the velocity of each flame is affected by a sheath is strongly influenced by fuel-to-oxidant ratio. (Author)

AD-B010 507/2 PC **A04**/MF **A01**
Air Force Aero Propulsion Lab., Wright-Patterson AFB, OH.
Investigation of Titanium Combustion Characteristics and Suppression Techniques.
Final rept. 1 Jan 74-1 Mar 75,
Duane G. Fox. Feb 76, 66p Rept no. AFAPL-TR-75-73
Distribution limitation now removed.

This test program studies the burning characteristics of titanium under air flow conditions. The flat plate titanium samples are ignited by molten titanium from an electrically heated ignitor. Air flow conditions that support sustained combustion of a single sample are determined. The burn rate is measured on all tests with steady state burning. Argon gas is shown to be a feasible extinguishing agent for a titanium fire. Quick injection of a sufficient amount of argon gas to maintain a 60% concentration by volume of argon results in quick suppression by oxygen depletion. Carbon dioxide (CO2), a common fire extinguishing agent, is shown to sustain titanium burning at an accelerated rate. The ultraviolet (UV) radiation emitted by burning titanium is shown to be of a sufficient intensity for existing UV fire detectors to detect at reasonable distances. (Author)

ARI-RR-177 PC **A25**/MF **A01**
Aerodyne Research, Inc., Bedford, MA.
PACKAGE (Plasma Analysis, Chemical Kinetics and Generator Efficiency): A Computer Program for the Calculation of Partial Chemical Equilibrium/Partial Chemical Rate Controlled Composition of Multiphased Mixtures under One Dimensional Steady Flow.
V. Yousefian, M. H. Weinberg, and R. Haimes.
Feb 80, 576p
Contract AC01-76ET10775

The NASA CEC Code was the starting point for PACKAGE, whose function is to evaluate the composition of a multiphase combustion product mixture under the following chemical conditions: (1) total equilibrium with pure condensed species; (2) total equilibrium with ideal liquid solution; (3) partial equilibrium/partial finite rate chemistry; and (4) fully finite rate chemistry. The last three conditions were developed to treat the evolution of complex mixtures such as coal combustion products. The thermodynamic variable pairs considered are either pressure (P) and enthalpy, P and entropy, at P and temperature. Minimization of Gibbs free energy is used. This report gives detailed discussions of formulation and input/output information used in the code. Sample problems are given. The code development, description, and current programming constraints are discussed. (ERA citation 05:037037)

DOE/ET/13152-3 PC **A04**/MF **A01**
Oregon State Univ., Corvallis. Dept. of Chemical Engineering.
Measuring and Modeling Solids Movement in a Large, Cold Fluidized Bed Test Facility. Third Quarterly Report, April 1-June 30, 1980.
T. J. Fitzgerald, R. V. Mrazek, and S. D. Crane.
Jun 80, 70p
Contract AC01-79ET13152

A considerable fraction of the apparent gas dispersion coefficient of a fluidized bed is due to a nondispersive meander of the bed gas as it travels up through the bed. The experimental results indicate that a dispersion coefficient which is obtained by measuring the time average concentration at some location in the bed and then comparing the concentration to the tracer inlet rate will overestimate the real turbulent/molecular dispersion coefficient by as much as 60 to 70%. The meander coefficient was observed to vary from 0.0005 ft exp 2 /sec at a superficial velocity of 1.5 ft/sec (about 1.9 u sub 0 /u/sub mf/) to about 0.068 ft exp 2 / sec at an air velocity of 6.0 ft/sec. The corresponding range in the turbulent/molecular dispersion coefficient was 0.004 ft exp 2 /sec to 0.10 ft exp 2 / sec. The meander coefficient shows a continued increase with air velocity whereas the turbulent/molecular coefficient was very close to the same value for the two highest velocities. There is some weak evidence of anisotropy in the meander dispersion coefficient. The turbulent/molecular coefficient seems to be independent of location. (ERA citation 05:035933)

DOE/ET/15457-8 PC **A05**/MF **A01**
General Electric Co., Schenectady, NY. Energy Systems Programs Dept.
Long Term Materials Test Program. Preliminary Operations Plan.
Mar 80, 97p
Contract AC01-79ET15457

The Long Term Materials Testing (LTMT) PFB facility has been designed to duplicate the design point condition of the Coal-Fired Combined Cycle (CFCC) reference commercial plant design developed by GE under contract to DOE, including bed temperature (1750 exp 0 F), pressure (10 atm), excess air (20%), and gas residence time (1.8 sec). The test rig has a one foot diameter bed and consumes about 1.6 tons/day of coal and 0.5 tons/day of dolomite sulphur sorbent. Material specimens are contained in two test sections. The low velocity test section houses 132 pin specimens 1/4 dia., sixty of which can be cooled below the gas stream temperature. The nominal exposure environment of 1650 exp 0 F, 10 atm, 27 fps should ensure representative corrosive conditions, without erosion. The control system for the LTMT facility is designed to operate the rig in such a manner that the test specimens are subjected to constant, controlled conditions representative of the actual service environment. The Preliminary Test Plan presented in Section V outlines three phases of PFB testing, plus screening tests for candidate materials. Operating costs have been updated to reflect the preliminary rig design data and current raw material quotes. The projected operating costs have been effected by raw material costs since the time of the original estimate, but the overall cost per hour of test is still very low: $122/test hour. (ERA citation 05:037082)

DOE/EV/04734-T1 PC **A15**/MF **A01**
Little (Arthur D.), Inc., Cambridge, MA.
Feasibility of Methods and Systems for Reducng LNG Tanker Fire Hazards.
Aug 80, 342p
Contract AC02-78EV04734

In this program concepts for reducing fire hazards that may result from LNG tanker collisions are identified and their technical feasibility evaluated. Concepts considered include modifications to the shipborne LNG containers so that in the event of a container rupture less of the contents would spill and/or the contents would spill at a reduced rate. Changes in the cargo itself, including making the LNG into a gel, solidifying it, converting it to methanol, and adding flame suppressants are also evaluated. The relative effectiveness and the costs of implementing these methods in terms of increased cost of gas at the receiving terminal, are explained. The vulnerability of an LNG tanker and its crew to the thermal effects of a large pool fire caused by a collision spill is estimated and methods of protecting the crew are considered. It is shown that the protection of ship and crew so that further deterioration of a damaged ship might be ameliorated, would require the design and installation of extraordinary insulation systems and life support assistance for the crew. Methods of salvaging or disposing of cargo from a damaged and disabled ship are evaluated, and it is concluded that if the cargo cannot be transferred to another (empty) LNG tanker because of lack of availability, then the burning of the cargo at a location somewhat distant from the disabled tanker appears to be a promising approach. Finally, the likelihood of the vapors from a spill being ignited due to the frictional impact of the colliding ships was examined. It is found that the heating of metal sufficient to ignite flammable vapors would occur during a collision, but it is questionable whether flammable vapor and air will, in fact, come in contact with the hot metal surfaces. (ERA citation 05:037178)

DOE/EV/06020-T4 PC **A10**/MF **A01**
Applied Technology Corp., Norman, OK.
Fire Safety of LPG in Marine Transportation.
W. E. Martinsen, D. W. Johnson, and J. R. Welker. Aug 80, 216p
Contract AC05-78EV06020

This report contains an analytical examination of cargo spill and fire hazard potential associated with the marine handling of liquefied petroleum gas (LPG) as cargo. Principal emphasis was on cargo transfer operations for ships unloading at receiving terminals, and barges loading or unloading at a terminal. Major safety systems, including emergency shutdown systems, hazard detection systems, and fire extinguishment and control systems were included in the analysis. Spill probabilities were obtained from fault tree analyses utilizing composite LPG tank ship and barge designs. Failure rates for hardware in the analyses were generally taken from historical data on similar generic classes of hardware, there being very little historical data on the specific items involved. Potential consequences of cargo spills of various sizes are discussed and compared to actual LPG vapor cloud incidents. The usefulness of hazard mitigation systems (particularly dry chemical fire extinguishers and water spray systems) in controlling the hazards posed by LPG spills and spill fires is also discussed. The analysis estimates the probability of

fatality for a terminal operator is about 10 exp -6 to 10 exp -5 per cargo transfer operation. The probability of fatality for the general public is substantially less. (ERA citation 05:037250)

ORNL/TM-7401 PC **A05**/MF **A01**
Oak Ridge National Lab., TN.
State of the Art of Pressurized Fluidized Bed Combustion Systems.
R. L. Graves. Sep 80, 95p
Contract W-7405-ENG-26

This report was prepared at the request of the Tennessee Valley Authority (TVA) to clarify the development status of the pressurized fluidized bed combustor (PFBC) and to place in perspective the problems which are yet to be solved before commercialization of the concept is practical. This report, in essence, supersedes the interim report published in 1979, Assessment of the State of the Art of Pressurized Fluidized Bed Combustion Systems. A brief overview of the PFBC concept is included citing potential advantages and disadvantages relative to atmospheric fluidized bed combustion (AFBC) and conventional pulverized coal plants. A survey of existing and developing PFBC experimental facilities is presented in some detail which includes the major accomplishments at the respective facilities. Recent data on plant emissions, turbine/gas cleanup systems, and overall efficiency are provided. Findings of several design studies are also discussed. The results of recent gas turbine and cascade tests have been encouraging although the full assessment of the accomplishments have not been made. The delay in construction of the Grimethorpe plant causes further delay in proof-testing full-size, rotating turbomachinery. Several parameters are recommended for further assessment in design studies including: (1) effect of turbine life on cost of power; and (2) effect of reduced gas turbine inlet temperature and pressure on cost of power. (ERA citation 05:037084)

SAND-80-1900C PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Observations of Vaporizing Water-in-Fuel Emulsion Droplets.
S. A. Sheffield, M. R. Baer, and G. J. Denison.
1980, 4p CONF-801118-2
Contract AC04-76DP00789
Fall technical meeting eastern section: the Combustion Institute, Princeton, NJ, USA, 12 Nov 1980.

These observations in a Leidenfrost-type experiment allowed one to distinguish between different mechanisms in the emulsion combustion process. Three events were observed: disruptions, heterogeneously nucleated vapor explosions, and homogeneously nucleated vapor explosions. The last event greatly enhances combustion. The cenospheres, carbospheres or oil-coke particles formed will be reduced or eliminated by the vapor explosions, and any small solid fragments are likely to be consumed in the enhanced combustion processes. (ERA citation 05:037039)

21C. Electric Propulsion

AD-A091 006/7 PC **A05**/MF **A01**
TRW Defense and Space Systems Group, Redondo Beach, CA.
Pulsed Plasma Propulsion System/Spacecraft Design Guide.
Final rept. Aug 78-Jun 80,
M. N. Huberman, and S. Zafran. Sep 80, 97p
AFRPL-TR-80-38
Contract F04611-78-C-0064

The purpose of this publication is to describe the characteristics of the millipound pulsed plasma propulsion system as an aid to potential spacecraft designers and users of electric propulsion. It contains performance and interface data, design constraints, and various other considerations applicable to the implementation of the pulsed plasma propulsion system. (Author)

21D. Fuels

AD-A090 977/0 PC **A05**/MF **A01**
Southwest Research Inst., San Antonio, TX. Army Fuels and Lubricants Research Lab.
Influence of Mico Fuels on Engine Performance, Exhaust Emissions, and Performance.
Interim rept.,
K. Tataiah, and S. J. Lestz. Dec 79, 87p Rept no. AFLRL-125
Contracts DAAK70-78-C-0001, DAAK70-80-C-0001

The influence of Micronized Coal-in-Oil (MICO) fuels on engine performance and exhaust emissions was experimentally studied in a single-cylinder Hatz diesel engine. One of these fuels, which contained 20 wt% coal, was also examined for its effects on engine endurance and wear in a four-cylinder Mercedes diesel engine. The performance and emissions tests were conducted at twelve different steady-state conditions covering the operating speed-load range of the engine. In each test, the exhaust emissions (including particulates, sulfates, and smoke), crankcase blowby, and temperatures were measured, and brake thermal efficiency and air-fuel ratio was calculated. The results obtained with the single-cylinder engine indicate that the coal in MICO fuel hinders the combustion of the diesel component and decreases the overall brake thermal efficiency of the engine. Although the coal reduces the consumption of diesel fuel component, the total energy consumption is higher.

AD-A091 318/6 PC **A06**/MF **A01**
Southwest Research Inst., San Antonio, TX. Army Fuels and Lubricants Research Lab.
Development of Army High-Energy Fuel for Diesel/Turbine Powered Surface Equipment.
Interim technical rept. Oct 77-Oct 79,
William W. Wimer, and Edwin C. Owens. Oct 79, 116p Rept no. AFLRL-120
Contracts DAAK70-78-C-0001, DAAK70-80-C-0001

This is a status report on the U.S. Army's ongoing program on high energy fuels for diesel/turbine powered surface equipment. The Army is interested in those fuels that have a high energy content per unit volume and therefore result in increased payload capabilities and/or extended operational range of their vehicles. Two types of high energy fuels are discussed in this report. The first being the synthetic liquid hydrocarbon fuels of the polycondensed cycloparaffinic type; the second being the powdered solids/hydrocarbon slurries. Background information is provided on several of the synthetic liquid hydrocarbon fuels; the Air Force's and the Navy's interests in these fuels are discussed; and a brief review of their chemistry and properties are included. Examples of these fuels are JP-9, JP-10 (exotetrahydrodicyclopentadiene), and RJ-5. Background material is also provided on various carbonaceous materials considered for use in slurry preparation. The selection of the carbons to be used along with their properties, are described. Also discussed are the mixing devices used in the preparation; the various dispersants considered; the stability of the various slurries; and the methods and techniques for measuring their settling rates and determining their stability.

ANL/EES-TM-95 PC **A06**/MF **A01**
Argonne National Lab., IL.
Method for Analyzing the Potential Feasibility of Coal Brokerage Operations.
K. Wilkie, and S. Vezeris. Aug 80, 104p
Contract W-31-109-ENG-38
Thesis.

There is one major prerequisite for unit train service. High volumes of coal are needed to make the operation both practical and economical. Many existing or potential coal users are too small to directly benefit from the cost savings and reliability of unit train service. If the demand for coal by a number of small users in a region could be aggregated so that the resulting volume was high enough to justify a unit train service, the users of the region could well be served through a single unit train receiving facility. Thus, coal users individually too small to receive unit train shipments could capture cost savings associated with a larger volume operation. It is the intent of this thesis to study the feasibility of such an operation, hereafter referred to as a coal brokerage. The specific purpose is to develop and present an analytical framework for evaluating the long-run economic feasibility of a coal brokerage for a region. The analysis views the brokerage operator, or broker, as a firm, and focuses on the relationships between its long-run cost function and market demand function for coal. (ERA citation 05:034519)

BNL-28297 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Flash Hydrogenation of Biomass.
M. Steinberg. 1980, 7p CONF-800973-2
Contract AC02-76CH00016
11. biomass thermochemical conversion contractors meeting, Richland, WA, USA, 23 Sep 1980.

It is proposed to obtain process chemistry information on the rapid hydrogenation of biomass (wood and other agricultural products) to produce light liquid and gaseous hydrocarbon fuels and feedstocks. The process is referred to as Flash Hydropyrolysis. The information will be of use in the design and evaluation of processes for the conversion of biomass to synthetic fuels and petrochemical feedstocks. Results obtained in an initial experiment are discussed. (ERA citation 05:036201)

BNL-51168 PC **A05**/MF **A01**
Brookhaven National Lab., Upton, NY.
Program Summaries for 1979: Energy Sciences Programs.
Dec 79, 87p
Contract AC02-76CH00016

This report describes the objectives of the various research programs being conducted by the Chemical Sciences, Metallurgy and Materials Science, and Process Science divisions of the BNL Dept. of Energy and Environment. Some of the more significant accomplishments during 1979 are also reported along with plans for 1980. Some of the topics under study include porphyrins, combustion, coal utilization, superconductors, semiconductors, coal, conversion, fluidized-bed combustion, polymers, etc. (ERA citation 05:036966)

CONF-7805214-(V.1) PC **A07**/MF **A01**
Massey Univ., Palmerston North (New Zealand). Dept. of Biotechnology.
Proceedings of the First Biotechnology Conference on Biomass and Energy.
May 78, 133p
Biotechnology conference on biomass and energy, Palmerston North, New Zealand, 24 May 1978.
U.S. Sales Only.

The proceedings of a conference addressing the use of renewable energy sources in New Zealand are presented. Separate abstracts of individual presentations are prepared for inclusion in the Energy Data Base. (ERA citation 05:036315)

CONF-7805214-(V.2) PC **A06**/MF **A01**
Massey Univ., Palmerston North (New Zealand). Dept. of Biotechnology.
Proceedings of the First Biotechnology Conference on Biomass and Energy.
May 78, 125p
Biotechnology conference on biomass and energy, Palmerston North, New Zealand, 24 May 1978.
U.S. Sales Only.

The proceedings of a conference addressing the use of renewable energy sources in New Zealand are presented. Separate abstracts of individual presentations are prepared for inclusion in the Energy Data Base. (ERA citation 05:036316)

CONF-7805214-(V.3) PC **A05**/MF **A01**
Massey Univ., Palmerston North (New Zealand). Dept. of Biotechnology.
Proceedings of the First Biotechnology Conference on Biomass and Energy.
May 78, 97p
Biotechnology conference on biomass and energy, Palmerston North, New Zealand, 24 May 1978.

U.S. Sales Only.

The proceedings of a conference addressing the use of renewable energy sources in New Zealand are presented. Separate abstracts of individual presentations are prepared for inclusion in the Energy Data Base. (ERA citation 05:036317)

CONF-800680-5 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Sample Management and Chemical Characterization of the Paraho/Sohio/US Navy Crude and Refined Shale Oil Suite.
W. H. Griest, M. R. Guerin, L. B. Yeatts, Jr., and B. R. Clark. 1980, 18p
Contract W-7405-ENG-26
Symposium on health effects investigations of oil shale development, Gatlinburg, TN, USA, 23 Jun 1980.

The role of the EPA/DOE Fossil Fuels Research Materials Facility in this study is to actively support and coordinate the health effects investigations of this oil shale development by acting as a central point for acquisition, cataloging, storage, and distribution of referenceable materials for study. In addition, selected materials are chemically fractionated for bioassay and are characterized in additional detail beyond that of routine stability monitoring. Finally, the Facility is acting as an information transfer agent to insure that the results of the investigations are made available to the oil shale industry and the funding agencies. This paper is concerned with the sample management and characterization aspect of the Facility's role in this study. (ERA citation 05:036002)

DOE/BETC/QPR-80/1 PC **A04**/MF **A01**
Department of Energy, Bartlesville, OK. Bartlesville Energy Technology Center.
Liquid Fossil Fuel Technology. Quarterly Technical Progress Report, January-March 1980.
B. Linville. Aug 80, 63p

Highlights of the BETC January-March 1980 quarter were: Gasohol was tested in a cooperative effort with Southwestern Bell Telephone Co. Two fleets of 55 cars were tested using gasohol in one and gasoline in the other. No problems were encountered. The gasohol-fueled cars had less emissions, and the fuel efficiencies for both fleets were approximately the same. An in situ combustion has been successfully started in a heavy oil deposit in Kansas. After some difficulties in starting the burn, it is now operating satisfactorily and producing oil. Cooperation between DOE and the Venezuelan oil industry was explored in a meeting at BETC that emphasized efforts to produce heavy oil. Cooperation through the International Energy Agency is expected to result in sharing of technology on enhanced oil recovery. Petroleum product surveys are produced cooperatively by DOE and the American Petroleum Institute. They give the properties of the products currently being marketed in the US. During the quarter, surveys on Motor Gasolines, Summer 1979 and Diesel Fuel Oils, 1979 were published. They are used to trace changes in characteristics and also to set specifications. The size of colloids, micelles, and emulsions in petroleum and associated liquids can be a factor in the design of improved recovery processes. The use of small angle x-ray scattering has been facilitated by a new method of calculation. The development of the Liquid Fossil Fuel Cycle has been facilitated by a workshop and further discussions resulting in a new statement Planning Framework for Liquid Fossil Fuel Cycle, March 1, 1980. This has now been used to prepare a computer-processible form to use in a critical path study of the BETC program. (ERA citation 05:035939)

DOE/EIA-0108(78) PC **A03**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
Crude Petroleum, Petroleum Products, and Natural Gas Liquids: 1978 (Final Summary).
19 Nov 79, 38p

Production of crude petroleum (including lease condensate) in the United States in 1978 averaged 8,707,000 barrels per day, an increase of 5.6% above the 1977 level. Imports of crude oil in 1978 averaged 6,356,000 barrels per day, 3.9% lower than the previous year. Stocks of crude oil, both domestic and foreign, totaled 376,281,000 barrels at the end of 1978, 28.6 million barrels above the 1977 year-end level. The average value of crude oil at the wellhead in 1978 was $8.96 per barrel, an increase of $.39 per barrel above the 1977 average price. The number of oil wells completed in 1978 totaled 17,775 compared with 18,912 in 1977. Production of products at natural gas processing plants during 1978 totaled 1,567,000 barrels per day compared with 1,618,000 barrels per day during 1977. The stock level of products at natural gas processing plants, terminals and pipelines at the end of 1978 totaled 127,479,000 barrels, 2.0 million barrels below that of a year earlier. Total disposition of primary supply of all oils in 1978 averaged 19,224,000 barrels per day. Compared to 1977, total products supplied for domestic use increased by 416,000 barrels daily, or 2.3%. Of the major fuels supplied for domestic use in 1978, gasoline, jetfuel, and distillate fuel oil showed gains of 3.3%, 1.7%, and 2.4%, respectively, while residual fuel oil declined by 1.6%. Refined products stocks at the end of 1978 totaled 784,619,000 barrels, reflecting a stock decrease of 57.9 million barrels during the year. Thirty-two tables are presented dealing with the above mentioned items. (ERA citation 05:036752)

DOE/EIA-0111/79 PC **A03**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
Energy Data Reports: Petroleum Refineries in the United States and US Territories.
1 Jan 79, 29p

Tables are presented for number and capacity of petroleum refineries in the United States and US territories; capacity of petroleum refineries in the United States and US territories; capacity of downstream facilities to which crude oil is charged directly; capacity of facilities under construction; and storage capacity at refineries in the United States. (ERA citation 05:034541)

DOE/EIA-0114(78) PC **A02**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
Sales of Liquefied Petroleum Gases and Ethane in 1978.
22 Oct 79, 12p

Tables are presented on: sales of liquefied petroleum gases and ethane in the United States, 1974 to 1978; sales of liquefied petroleum gases and ethane by use, excluding use in gasoline production; sales of liquefied petroleum gases for residential and commercial use, by type; sales of liquefied petroleum gases for internal-combustion engine fuel, by type; sales of liquefied petroleum gases for industrial use; sales of liquefied petroleum gases for use as utility gas; sales of liquefied petroleum gases for miscellaneous uses; sales of liquefied petroleum gases and ethane for chemical use including synthetic rubber manufacture by type; and on liquefied petroleum gases exported from the United States, by countries. (ERA citation 05:036753)

DOE/EIA-0120/77 PC **A03**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
Coke and Coal Chemicals in 1977.
7 Mar 79, 34p

Data are presented on: production of oven coke, beehive coke, breeze and coal chemicals; quantity, origin, characteristics and value of coal carbonized; and sales and transfer of coke, breeze and coal chemicals to affiliated operations. (ERA citation 05:034465)

DOE/EIA-0120(78) PC **A03**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
Coke and Coal Chemicals in 1978.
23 Nov 79, 27p

Data are presented on: quantity, characteristics, origin and value of coal carbonized; quantity of coke, breeze and coal-chemical material produced; quantity and value of coke, breeze and coal-chemical materials used or sold; quantity of coke and breeze distributed; and quantity of coke, breeze and coal-chemical material stocks. (ERA citation 05:034466)

DOE/EIA-013(78) PC **A02**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
Natural Gas Production and Consumption.
12 Oct 79, 12p

Data are presented on the marketed production of natural gas in the USA, imports of natural gas, natural gas consumption and withdrawals from underground facilities for 1978. Withdrawals and dispositions for 1977 and 1978 are tabulated according to individual state. Marketed production, interstate shipments, and total consumption are tabulated according to state and region. The number of producing wells in the USA are tabulated by district and state. (ERA citation 05:034566)

DOE/EIA-0188/78 PC **A02**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
United States Imports and Exports of Natural Gas 1978.
8 Jun 79, 12p

Tables are presented on the following items: summary of US pipeline imports and exports of natural gas; volume and cost of natural gas pipeline imports; volume and cost of natural gas pipeline exports; volume and cost of liquefied natural gas imports; and volume and cost of liquefied natural gas exports. (ERA citation 05:035986)

DOE/EIA-0201/3 PC **A05**/MF **A01**
Department of Energy, Washington, DC. Energy Information Administration.
Pricing Provisions of the Natural Gas Policy Act of 1978. Energy Policy Study, Volume 3.
P. F. Dickens, III, and R. Thrasher. Oct 79, 96p

The Natural Gas Policy Act of 1978 represents a major change in the regulation of natural gas. The Act extends the authority of the Federal Energy Regulatory Commission to virtually all natural gas production, establishes a set of ceiling prices for natural gas at the wellhead, and provides a method for allocating the costs of high-cost gas among end users. This study was conducted to explore the effects of the current regulatory structure on the prices and quantities observed in the markets for natural gas and to compare the regulated markets with the results that might be expected to exist in the absence of specific controls on natural gas markets. To assist in this effort, first of all, a short description of the natural gas market, the production process, and a brief review of past regulation are presented. The pricing provisions of the NGPA, effects of the NGPA pricing, incremental pricing and its effects, and non-price allocation on natural gas curtailments and priority access are covered in detail. The general conclusion is that relative to an unregulated market, the price controls of the NGPA have the effect of redistributing wealth from producers of natural gas to consumers. To the extent that society values the redistributive aspects of the controls, this Act may offset or exceed the valuation of the efficiency loss relative to a free market occasioned by these programs. (ERA citation 05:034568)

DOE/EIA/10617-T1 PC **A08**/MF **A01**
TERA, Inc., Arlington, VA.
Capital Requirements for the Transportation of Energy Materials: 1979 ARC Estimates. Draft Final Report.
13 Aug 80, 153p
Contract AC01-80EI10617

This report contains TERA's estimates of capital requirements to transport natural gas, crude oil, petroleum products, and coal in the United States by 1990. The low, medium, and high world-oil-price scenarios from the EIA's Mid-range Energy Forecasting System (MEFS), as used in the 1979 Annual Report to Congress (ARC), were provided as a basis for the analysis and represent three alternative futures. TERA's approach varies by energy commodity to make best use of the information and analytical tools available. Summaries of transportation investment requirements through 1990 are given. Total investment requirements for three modes (pipelines, rails, waterways and the three energy commodities can accumulate to a $49.9 to $50.9 billion range depending on the scenario. The scenarios are distinguished primarily by the world price of oil which, given deregulation of

domestic oil prices, affects US oil prices even more profoundly than in the past. The high price of oil, following the evidence of the last year, is projected to hold demand for oil below the recent past. (ERA citation 05:035041)

DOE/ER/00854-29 PC **A03**/MF **A01**
Georgia Univ., Athens. Dept. of Chemistry.
Characterization of Carbonaceous Materials Using Extraction with Supercritical Pentane.
J. C. Fetzer, J. A. Graham, R. R. Arrendale, M. S. Klee, and L. B. Rogers. 30 May 80, 30p
Contract AS09-76ER00854

The use of carbonaceous adsorbents is limited by irreversible adsorption of some compounds so the use of supercritical pentane as an extracting solvent was examined. Carbon black appeared to be broken down slowly, but continuously, by the penane. To see if other types of carbon behaved similarly, high purity graphite, technical grade graphites, active carbons, and charcoals were examined. The extracts were characterized by uv spectroscopy, packed column chromatography using flame ionization and flame photometric detectors, and capillary GC/MS. The extracts were characteristic for each class of carbonaceous material. The high purity graphite yielded large, polycyclic aromatic compounds; the technical grade graphites yielded alkanes and alkyl-substituted benzenes and naphthalenes; the active carbons yielded alkanes, dienes, and small amounts of alkyl-substituted benzenes; and the charcoals yielded almost entirely alkanes in small amounts. (ERA citation 05:035885)

DOE/ET/10149-T2 PC **A13**/MF **A01**
Amoco Oil Co., Naperville, IL. Research and Development Dept.
H-Coal Fluid Dynamics. Final Report, August 1, 1977-December 31, 1979.
16 Apr 80, 296p
Contract AC05-77ET10149

This report presents the results of work aimed at understanding the hydrodynamic behavior of the H-Coal reactor. A summary of the literature search related to the fluid dynamic behavior of gas/liquid/solid systems has been presented. Design details of a cold flow unit were discussed. The process design of this cold flow model followed practices established by HRI in their process development unit. The cold fow unit has been used to conduct experiments with nitrogen, kerosene, or kerosene/coal char slurries, and HDS catalyst, which at room temperature have properties similar to those existing in the H-Coal reactor. Mineral oil, a high-viscosity liquid, was also used. The volume fractions occupied by gas/liquid slurries and catalyst particles were determined by several experimental techniques. The use of a mini-computer for data collection and calculation has greatly accelerated the analysis and reporting of data. Data on nitrogen/kerosene/HDS catalyst and coal char fines are presented in this paper. Correlations identified in the literature search were utilized to analyze the data. From this analysis it became evident that the Richardson-Zaki correlation describes the effect of slurry flow rate on catalyst expansion. Three-phase fluidization data were analyzed with two models. (ERA citation 05:035886)

DOE/ET/10692-T1 PC **A05**/MF **A01**
California Univ., Los Angeles. School of Engineering and Applied Science.
Mechanism of Corrosion of Structural Materials in Contact with Coal Chars in Coal Gasifier Atmospheres. Final Report.
D. L. Douglass, V. S. Bhide, and E. Vineberg. May 80, 96p
Contract AT03-76ET10692

Six alloys, 310 stainless steel, Hastelloy X, Inconel 671, Incoloy 800, Haynes 188, and FeCrAlY (GE1541 and MA956), were corroded in two chars at 1600 and 1800 exp 0 F. The chars, FMC and Husky, contained 2.7 and 0.9% sulfur, respectively. Various parameters were investigated, including char size, cover gas, char quantity, char replenishment period, gas composition, and the use of coatings. The corrosion process was strictly sulfidation when the char was replenished every 24 hours or less. The kinetics of reaction were nearly linear with time. The reaction resulted in thick external sulfide scales with extensive internal sulfidation in the substrate. The kinetics and reaction-product morphologies suggested that diffusion through the sulfide scale played a minor role and that ar interfacial reaction was the rate-controlling step. A mathematical model was developed which supported this hypothesis. The reaction rates showed a relatively minor role on alloy composition, depending upon whether the alloys were tested singularly or in combination with others. Inconel 671, the best alloy in CGA environments, consistently corroded the most rapidly of the chromia-former types regardless of char sulfur content or of the temperature. Type 310 stainless was marginally better than Inconel 671. Incoloy 800 was intermediate, whereas, Haynes 188 and Hastelloy X exhibited the best corrosion resistance. The FeCrAlY alloys reacted very rapidly in the absence of preoxidation treatments. All alloys corroded in char at least 1000 times more rapidly than in the CGA (MPC-ITTRI) environment. None of the alloys will be acceptable for use in contact with char unless coatings are applied. (ERA citation 05:035871)

DOE/ET/10698-T1 PC **A03**/MF **A01**
California Univ., Los Angeles. School of Engineering and Applied Science.
Effect of Preoxidation on the Corrosion of Some Alloys in Coal Chars and Sulfur Vapor. Final Report.
D. L. Douglass, and S. Sheybany. May 80, 41p
Contract AT03-76ET10698

Preoxidation of several chromia-former and of several alumina-former alloys at temperatures ranging from 1800 to 2300 exp 0 F in either water-saturated argon or in air was performed prior to corrosion in coal char or in sulfur vapor. Chromia films offered no protection to sulfidation in both char and sulfur vapor environments. The chromia films were adherent but permitted rapid inward penetration of sulfur and outward penetration of cations to form extensive sulfides. Alumina films offered protection for much longer times than chromia films but localized cracking and/or spalling of the alumina permitted rapid attack at the exposed areas. The addition of yttrium as either a metallic element or as an oxide dispersion improved the mechanical stability of the films and prolonged the period of protectiveness. A binary alloy, Fe-13Al, sulfidized more raidly after preoxidation than before preoxidation. Alumina films would provide an excellent protective barrier if thick, crack-free films could be grown at reasonable temperatures. The low growth rates at very high temperatures and the susceptibility of alumina films to crack and spall during thermal cycling suggest that preoxidation will not offer adequate corrosion resistance for alloys exposed to char in goal gasifiers. (ERA citation 05:035872)

DOE/ET/14696-T3 PC **A06**/MF **A01**
Dynatech R/D Co., Cambridge, MA.
Peat Biogasification Development Program. Quarterly Progress Report No. 3, April 1-June 30, 1980.
D. L. Wise. 1980, 106p
Contract AC01-79ET14696

Procedures for High Pressure Liquid Chromatography (HPLC) are under development that will identify and quantify fermentable material contained in pretreated peat liquors. Several of the model compounds hypothesized to be a product of peat pretreatment have been identified with HPLC and confirmed with Thin Layer Chromatography (TLC). However, there are numerous unknown peaks of other products for which elution times and extinction coefficients must be determined in order to make HPLC a quantitative analytical tool for kinetic data. (ERA citation 05:035873)

DOE/ET/14800-13 PC **A05**/MF **A01**
Pittsburg and Midway Coal Mining Co., Shawnee Mission, KS.
Exploratory Research on Solvent Refined Coal Liquefaction. Annual Technical Progress Report, January 1-December 31, 1979.
Sep 80, 100p
Contract AC01-79ET14800

This report summarizes the progress of the Exploratory Research on Solvent Refined Coal Liquefaction project by The Pittsburg and Midway Coal Mining Co.'s Merriam Laboratory during 1979. In a series of experiments with varying feed gas composition, low levels (5 to 10 mole %) of carbon monoxide had little effect on the SRC II processing of Pittsburgh Seam coal (Powhatan No. 5 Mine) while higher levels (20 to 40 mole %) resulted in a general degradation of operability and reduced oil yields. Addition of finely divided (approx. 1 mu m) pyrite to the reactive Powhatan coal had little effect on oil yields although the molecular weight of the distillation residue was apparently decreased. When finely divided pyrite and magnetite were added to the less reactive coals from the Loveridge and Blacksville No. 1 Mines (also Pittsburgh Seam), however, substantial increases in oil yields and product quality were obtained. In a comparison of upflow and downflow dissolver configurations with Powhatan coal in the SRC II mode, there was no difference in yields or product quality. A study characterizing specific reactors revealed a significantly higher conversion in the SRC I mode with a reactor approximating plug flow conditions compared to a completely backmixed reactor. In the SRC II mode there was only a slightly higher oil yield with the plug flow reactor. (ERA citation 05:035887)

DOE/ET/20074-T1 PC **A02**/MF **A01**
BioEnergy Development Corp., Hilo, HI.
Eucalyptus Plantations for Energy Production in Hawaii. Technical Status Report, October 1, 1978-June 30, 1980.
14 Jul 80, 17p
Contract FC03-78ET20074

Progress made on accomplishing research objectives is reported. The objectives of this project are: (1) to increase the biomass production of Eucalyptus; (2) to determine the optimum requirements to maximize yield; (3) to assess planting, cultivation, harvesting, and transportation equipment requirements; (4) to determine the optimum mixture of biomass (eucalyptus and bagasse) at the generator for the production of electricity; and (5) to evaluate a complete production/conversion system which utilized optimum management conditions in relationship to costs. (ERA citation 05:034660)

DOE/ET/20481-4 PC **A13**/MF **A01**
Purdue Univ., Lafayette, IN.
Selective Solvents Extraction in Utilization of Stored Solar Energy in Cellulosic Biomass. Final Report, January 1, 1978-December 31, 1979.
G. T. Tsao. 1 Jul 80, 292p
Contract AC02-78ET20481

Work on cellulose utilization at Purdue has emphasized pretreatment of lignocellulosic materials with various cellulose solvents to enhance the rate and extent of cellulose conversion to glucose. The following subtasks are discussed: the mechanism of cellulose solvents in dissolving cellulose; the hydrolysis of solvent-treated cellulose; aqueous gel permeation chromatography; membrane reactor for enzymatic hydrolysis of cellobiose; and the fermentation of corn stover hemicellulose hydrolysates to butanediol and ethanol. (ERA citation 05:036319)

DOE/LETC/RI-80/12 PC **A03**/MF **A01**
Department of Energy, Laramie, WY. Laramie Energy Technology Center.
Characterization of Nitrogen Compound Types in Hydrotreated Paraho Shale Oil.
S. A. Holmes, and D. R. Latham. Oct 80, 38p

Results from the separation and characterization of nitrogen compound types in hydrotreated Paraho shale oil samples were obtained. Two samples of Paraho shale oil were hydrotreated by Chevron Research Company such that one sample contained about 0.05 wt. percent nitrogen and the other sample contained about 0.10 wt. percent nitrogen. A separation method concentrate specific nitrogen compound types was developed. Characterization of the nitrogen types was accomplished by infrared spectroscopy, mass spectrometry, potentiometric titration, and elemental analysis. The distribution of nitrogen compound types in both samples and in the Paraho crude shale oil is compared. (ERA citation 05:036003)

DOE/PE/70106-T3 PC **A06**/MF **A01**
John F. Kennedy School of Government, Cambridge, MA.

Regulation and Deregulation of Natural Gas in the US: 1938-1985.
P. R. Merrill. Jun 80, 104p
Contract AM01-79PE70106

Public policy towards natural gas has swung first towards, and then away from regulation in this century. In 1906, the Congress specifically excluded natural gas from the jurisdiction of the Interstate Commerce Commission. Three decades later, a New Deal Congress passed the Natural Gas Act of 1938 bringing pipelines under the control of the Federal Power Commission (FDC). Forty years thereafter, the Congress passed a phased decontrol bill, the Natural Gas Policy Act (NGPA) of 1978, as part of the Carter Administration's National Energy Plan. Recently, the Congress has backed off from New Deal legislation in other markets - notably aviation and trucking. In this study, the rise and fall of economic regulation in the natural gas industry are examined to understand: (1) why public policy has followed a pendulum's path, and (2) the economic consequences of regulation and deregulation. The main part of the analysis is directed toward the Natural Gas Policy Act of 1978. Widely viewed as a deregulation measure, the author finds that the Act is more restrictive and burdensome than the pricing policies it superceded. The path toward deregulation in natural gas and perhaps other markets is not as direct or simple as might be expected. (ERA citation 05:035987)

DOE/RG/10073-T1 PC **A04**/MF **A01**
National Inst. for Community Development, Inc., Arlington, VA.
Preparation, Assembly and Entry of Data into the SPEAKEASY Data Base. Final Report.
Feb 80, 64p
Contract AC01-79RG10073

The purpose of this study was to provide assistance of non-policy nature in preparing data bases relating to the supply demand and price of crude oil, natural gas and other petroleum products. The data bases were to be used in determining the impact of decontrol of oil prices, announced by the President on April 5, 1979, on oil production, conservation of existing energy supplies, development of alternative energy sources, and dependency on foreign oil. (ERA citation 05:035974)

DOE/R5/10110-2 PC **A02**/MF **A01**
Metropolitan Sanitary District of Greater Chicago, IL.
Digester Gas Utilization at West-Southwest Sewage Treatment Works. Final Technical Report.
1980, 7p
Contract FG02-79R510110

The physical site and operation of the West Southwest Sewage Treatment Works of the Metropolitan Sanitary District of Greater Chicago are described. Over a billion gallons of sewage is handled each day. Influent is screened to remove large debris, flows through preliminary settling tanks to separate most suspended and floating scum solids, passes through aeration tanks which assist biological decomposition of remaining impurities, and is allowed to settle again before chlorination and/or discharge to the waterway. Sludges collected during the process are mixed with scum and ground screenings, concentrated by gravity or mechanical means, and, in the case pertinent to the subject project, are fed to digestion tanks where the action of anaerobic bacteria generates heat and combustible gas, primarily methane. Digested sludge can be further concentrated and disposed of by application on strip mined land. Gas generated during anaerobic digestion has averaged approximately 2.7 million standard cubic feet per day. Of this amount, 1.7 million SCF per day is used keeping the digesters heated to the proper temperature for the bacteria to thrive. The excess 1.0 million SCF per day is piped from the digesters and burned to supply power for low pressure steam generator. (ERA citation 05:036859)

DOE/TIC-11250 PC **A10**/MF **A01**
Oak Ridge National Lab., TN.
Fuels and Chemicals from Woody Biomass Program. Seventh Quarterly Progress Report.
Jun 80, 218p
Contract W-7405-ENG-26

Work accomplished this quarter was related to maintenance and measurement of field plots in the spring of the second growing season and involves survival counts, mortality replacement, fertilizer applications and weed control. Progress is reviewed on species screening and genetic selection, stand establishment and management, and harvest, collection, transport, and storage. Quarterly reports from individual contractors are appended. A separate abstract was prepared for one final report. (ERA citation 05:036322)

DOE/TIC-11252 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Fuels and Chemicals from Woody Biomass Program. Program Plan FY82-86.
7 Feb 80, 15p
Contract W-7405-ENG-26

The feasibility of producing and procuring woody biomass for purposes of near-term energy production and petrochemical substitution is demonstrated. The harvesting and handling of the biomass and the kind of procurement system needed to assure adequate supplies are discussed. Economics and energetics of producing woody products for conversion purposes or other uses for wood are considered. Regional and national assessments of wood technology environmental impacts and land use are also provided. The legal aspects involved in the commercialization of wood energy are also considered. (ERA citation 05:034663)

DOE/TIC-11254 PC **A05**/MF **A01**
Oak Ridge National Lab., TN.
Fuels and Chemicals from Woody Biomass Program. Sixth Quarterly Progress Report, September-December 1979. Summary. Contractor Quarterly Reports.
1979, 93p
Contract W-7405-ENG-26

The project quarterly reports are presented under the following categories: species selection, stand establishment, cultural treatments and management alternatives, and harvest, collection, transport, and storage. (ERA citation 05:036324)

EPRI-AP-1508 PC **A03**/MF **A01**
Westinghouse Research and Development Center, Pittsburgh, PA.
Design Properties of Steels for Coal Conversion Vessels: Report on Long-Term Testing.
D. E. McCabe, and J. D. Landes. Sep 80, 48p

This interim report describes the results of fracture toughness measurements made in simulated coal conversion environments, utilizing specimens held under sustained load or sustained deflection for six months. Planned coal conversion techniques involve internal pressures as high as 25 MPa and metal temperatures as high as 727 exp 0 K. The product streams will contain various amounts of CO, CO sub 2 , H sub 2 O, NH sub 3 , H sub 2 S, and H sub 2 . Under these conditions, structural steels may be degraded by deleterious interactions between the steels and the environments. The only design basis available at present, for pressure vessels operating in high-pressure, high-temperature hydrogenous environments, is the empirical Nelson diagram approach used by the petrochemical industry. The present problem was undertaken, therefore, to develop a quantitative fracture mechanics base for 2 1/4 Cr-1 Mo steel, with a variety of metallurgical and environmental conditions that may be typically encountered in coal liquefaction and gasification. The present report deals only with the results of the long-time, sustained deflection tests and the sustained load tests. The main thrust of the results seems to be that the fracture toughness of the steels is not degraded appreciably at the elevated temperatures, due to exposure to hydrogenous environments; such exposure, however, results in a significant loss of the room-temperature fracture toughness, due to embrittlement by retained hydrogen. There is some evidence that creep- and stress-relation processes may be more important at 727 exp 0 K (800 exp 0 F) than prior experience with the steel might indicate. (ERA citation 05:035875)

EPRI-CS-989(V.3) PC **A03**/MF **A01**
Science Applications, Inc., Palo Alto, CA.
Nuclear Assay of Coal. Volume 3: Determination of Total Hydrogen Content of Coal by Nuclear Techniques. Final Report.
T. Gozani, E. Elias, and H. Bozorgmanesh. Apr 80, 26p

The hydrogen content of coal is of primary concern to both designers and operators of coal-based utility plants. This report reviews possible nuclear techniques for determining the total hydrogen content of coal given the wide variations in composition and density found in practical measurement. This study was based on theoretical neutron transport calculations and laboratory experiments. This study has shown that hydrogen is most accurately determined by measuring the leakage of epithermal neutrons from a slab sample 30 cm thick. Using this method, hydrogen density was measured with an average absolute error of 6.2 x 10 exp -4 g/cm exp 3 . For example, for 6 percent weight hydrogen and an average bulk density of 0.7 g/cm exp 3 , the average relative error is less than 1.5 percent. This result was achieved with no prior knowledge regarding the type, composition, and bulk density of the sample. Higher accuracy is achievable if the variations in coal type are bounded. Although this study was directed towards coal measurement, its main conclusions can in principle be applied to other solid materials of variable bulk density and elemental composition. (ERA citation 05:035903)

EPRI-CS-989(V.4) PC **A04**/MF **A01**
Science Applications, Inc., Palo Alto, CA.
Nuclear Assay of Coal. Volume 4: Moisture Determination in Coal - Survey of Electromagnetic Techniques. Final Report.
D. R. Brown, T. Gozani, E. Elias, H. Bozorgmanesh, and R. Bevan. Apr 80, 60p

This survey consists of two basic parts. The first consists of a survey of various non-nuclear moisture determination techniques. Three techniques are identified as promising for eventual on-line application with coal; these are capacitance, microwave attenuation, and nuclear magnetic resonance (NMR) techniques. The second part is devoted to an in-depth analysis of these three techniques and the current extent to which they have been applied to coal. With a given coal type, accuracies of +- 1% absolute in moisture content are achievable with all three techniques. The accuracy of the two electromagnetic techniques has been demonstrated in the laboratory and on-line in coal burning plants, whereas only small samples have been analyzed with NMR. The current shortcoming of the simple electromagnetic techniques is the sensitivity of calibrations to physical parameters and coal type. NMR is currently limited to small samples sizes and non-rugged design. These findings are summarized and a list of manufacturers of moisture analyzers is given in the Appendix. (ERA citation 05:035904)

EPRI-CS-989(V.7) PC **A03**/MF **A01**
Science Applications, Inc., Palo Alto, CA.
Nuclear Assay of Coal. Volume 7. Coal Rheology and Its Impact on Nuclear Assay. Final Report.
T. Gozani, R. Hogg, and P. Luckie. Apr 80, 34p

A number of possible techniques for introducing coal to a continuous on-line nuclear analysis of coal (CONAC) system have been evaluated, including flow methods and nonflow methods. A modified flat-belt feeder system was recommended. The success of such a coal-presentation technique would rely on proper entry to the feed hopper, shape of the withdrawal opening from the feed hopper, and a slow belt speed to minimize demixing. (ERA citation 05:035906)

FE-2286-60 PC **A10**/MF **A01**
Institute of Gas Technology, Chicago, IL.
Preparation of a Coal Conversion Systems Technical Data Book. Project 61003 Quarterly Report, November 1, 1979-January 31, 1980.
Aug 80, 225p
Contract AC01-76ET10255

Comparison results of evaluations on the SURFIMP program with experimental quaternary data on the NH sub 3 -CO sub 2 -H sub 2 S-H sub 2 O system are presented. Physical and thermodynamic properties of Furan and Tetrahydrofuran are pre-

sented both in SI and British units. The heating values and compositions of coal and char analyzed at IGT for the HYGAS program have been correlated. The standard deviation of the prediction, using the resulting correlation, is about 85 Btu/lb. Results from the literature on the carbon-carbon dioxide reaction rates have been collected, evaluated and tabulated. The forms of carbon used in the reaction studies included: char, coke, graphite, carbon black, etc. The reaction temperature and pressure ranges from 700 to 1600 exp 0 C and from subatmospheric pressure to 36 atmospheres, respectively. Atmospheric fluidized bed boiler, pressurized fluidized bed boiler, combined open gas-steam turbine cycle with integrated low-Btu gasifier, combined gas-steam turbine cycle using coal derived liquid fuel-potassium topping/steam bottoming cycle-pressurized fluidized bed boiler, and closed cycle gas turbine-helium/organic bottoming-atmospheric fluidized bed boiler were analyzed using thermodynamic availability functions. The availability efficiency and effectiveness of these processes are reported. An attrition mathematical model which is used for predicting the changes in particle size distribution in a fluidized bed reactor has been proposed. (ERA citation 05:035862)

FE-2315-52 PC **A03**/MF **A01**
Chevron Research Co., Richmond, CA.
Refining and Upgrading of Synfuels from Coal and Oil Shales by Advanced Catalytic Processes. Quarterly Report, January-March 1980.
R. F. Sullivan, and D. J. O'Rear. Mar 80, 41p
Contract EX-76-C-01-2315

Asphaltenelike impurities in the Illinois and Wyodak H-Coal syncrudes were found to have a large effect on the performance of the hydrotreating catalyst which upgrades these syncrudes to jet or diesel fuels. When these impurities are removed by redistilling the syncrudes, the space rate of the Illinois H-Coal syncrude hydrotreater can be increased from 0.5 to 1.5 with constant product quality and catalyst performance. After hydrotreating, a small amount of 600 exp 0 F+ oil in the products from the whole H-Coal syncrudes makes the products fail several jet fuel tests: gravity, gum content, end point, and occasionally freeze point. When the 600 exp 0 F+ oil is removed, either by distilling the syncrude or hydrotreated product, these specifications are met. Fuel oils can be made from the whole H-Coal syncrudes at either moderate conditions (1800 psia and 1.5 LHSV) or at severe conditions (2300 psia and 0.5 to 1.0 LHSV). At moderate conditions the hydrogen consumption is low and the aromatic product almost meets the specification for gravity and viscosity. However, this oil which contains approx. 50% aromatics may cause smoke in some burners. At severe conditions the hydrogen consumption is high but the product contains less than 5% aromatics. While all heating fuel specifications are met for this product, it would probably be used as more valuable jet or diesel fuel. (ERA citation 05:035888)

FE-2346-75 PC **A06**/MF **A01**
Dow Chemical Co., Midland, MI. Process Development Dept.
Energy from True in Situ Processing of Antrim Shale: Sampling and Analytical Systems.
R. K. Pihlaja. Aug 80, 106p
Contract AC01-76ET12153

Reliable on-line analysis of production gas composition is fundamental to the success of an in situ extraction experiment in Antrim shale. An automated sampling and analysis system designed to meet this need has provided high quality analytical data for three extraction trials without a single day when no data were taken. The production gas samples were routinely analyzed by both gas chromatography (GC) and a bank of continuous on-line process gas analyzers. The GC's analyzed for H sub 2 , O sub 2 + Ar, N sub 2 , CO, CO sub 2 , SO sub 2 , H sub 2 S, individual C sub 1 - C sub 5 hydrocarbon species, and lumped C sub 6 + hydrocarbon species, each analysis requiring up to an hour to run. The process gas analyzers measured CO, CO sub 2 , total hydrocarbons (% vol CH sub 4 equivalent), and O sub 2 continuously. The process gas analyzers were shown to be especially well suited for this application because of their fast response. The GC data provided itemized composition details as well as an independent check of process analyzer data. Sample selection, data collection and processing from both the GC's and process gas analyzers was handled by a Perkin Elmer Sigma-10 minicomputer. The combination of the two analytical techniques and automated data handling yielded a versatile and powerful system. The production gas sampling system demonstrated the feasibility of transmitting a properly treated gas sample through a long (1000 ft) 1/8" diameter sample line. The small bore tubing allowed the analytical instruments to be located a safe distance away from the well heads and yet maintain a reasonably short sample transport lag time without handling large volumes of gas. (ERA citation 05:035995)

FE-2346-76 PC **A03**/MF **A01**
Dow Chemical Co., Midland, MI. Process Development Dept.
Energy from True in-Situ Processing of Antrim Shale: Methane Burner Ignition System.
M. L. VanDerPloeg, and R. K. Pihlaja. Aug 80, 34p
Contract AC01-76ET12153

A rugged yet simple burner that can be easily ignited and reignited is a necessity if in situ thermal methods of energy extraction are to be feasible. During extraction trials at the Dow Chemical Company's oil shale site at Peck, Michigan such a burner was utilized. The performance of the TOR Development burner and ignitor system proved to be reliable and practical under field conditions. However, some recently discovered measures are crucial in protecting the burner and associated downhole hardware. With such precautions burner life was extended by a factor of 15. In the first trial burner life was two days and in the second trial the burner remained intact at least thirty days. Also described is a system which monitored burner performance by continuously analyzing burner exhaust gases. A slip stream sampling technique utilized the high well pressure to transport, at nearly Mach I, a sample of burner exhaust gas to the analytical trailer. There the sample was analyzed for CO, CO sub 2 , unburned hydrocarbons, and O sub 2 by a bank of high speed process gas analyzers. Burner flameouts could be detected in less than 2 minutes. Also the system allowed burner (air/fuel) ratios to be determined on a real time basis. These ratios were used for (1) setting the proper air-fuel mixtures for ignition and steady state operation, (2) leak detection, (3) estimation of burner deterioration after extended use, and (4) study of the burner's steady state and transient response characteristics. (ERA citation 05:035996)

FE-2346-83 PC **A08**/MF **A01**
Wayne State Univ., Detroit, MI.
Fischer Assay Analyses of the Antrim Oil Shale of the Michigan Basin.
C. B. Leffert, and R. R. Schroeder. Aug 80, 164p
Contract AC01-76ET12153

Modified Fischer Assays were run and are reported on 841 samples of Antrim Oil Shale. These samples were taken from 31 wells and 9 outcrop locations throughout the Michigan Basin. Yields in both weight percent of oil, water, spent shale, gas plus loss and in gal/ton of oil and water and oil specific gravity are tabulated. Procedures, apparatus and instrumentation adapted for this work were shown by comparison tests and by repetitive assays to be accurate and precise. Data recording, calculations, data storage and plotting were all done using computer programs, files and tapes. The oil yield in gal/ton of shale is plotted versus drillers depth in feet for each of the 31 wells and for three cross sections across the Michigan Basin. The average oil yields for these three cross sections were: Northern, 4.78 gal/ton; Central, 4.49 gal/ton; and Southern, 4.64 gal/ton. The average oil yield was 4.67 gal/ton. Probability density curves resembled a Gaussian-type distribution with an added spike of near-zero yield material which was attributed to a small amount of sampling above and below the Antrim formation and the intrusion of some noncarbonaceous material into the Antrim in some locations. The density function for the entire formation showed fractional yields of oil of only 20% > 7.0 gal/ton, 15% > 8.0 gal/ton and 5.0% > 11 gal/ton. The average oil yield represents for an estimated 44,500 square miles of the Michigan Basin the potential of 2.8 trillion barrels of Fischer Assay extractable oil. (ERA citation 05:036004)

FE-3297-5 PC **A03**/MF **A01**
Delaware Univ., Newark. Dept. of Chemical Engineering.
Development of Unique Catalysts for Hydrodenitrogenation of Coal-Derived Liquids.
J. R. Katzer, A. B. Stiles, and H. Kwart. 1 Feb 80, 46p
Contract AS01-78ET03297

Experimental runs using decahydroquinoline as a reactant have been made. It would appear that hydrodenitrogenation requires an acidic site and a basic site for the beta -elimination reaction to occur. Runs have also been made using sulfided and unsulfided catalysts. Previously, it was thought that the sulfur formed during sulfiding of the catalyst could block the active sites of the catalyst and inactivate it. However, there was no significant difference in nitrogen removal rate between the sulfided and unsulfided catalyst, indicating that sulfiding of these catalysts does not deactivate them. Several catalysts have been prepared and tested with the emphasis on understanding the nature of catalyst function responsible for carbon-nitrogen bond scission. The catalysts tested include catalysts with Co and Ni impregnated on silica-alumina or gamma -alumina supports. However, neither one displayed adequate nitrogen removal rates. The rate of nitrogen removal was highest for the molybdenum on gamma -alumina catalyst. Several catalysts were prepared with the objective of developing new hydrodenitrogenation catalysts which would selectively coordinate the nitrogen atom and remove it without hydogenating the entire ring. Catalysts prepared by coprecipitation and by impregnation were compared for their nitrogen removal rates, using decahydroquinoline as the reactant. Preliminary results indicate that the catalyst prepared by coprecipitation removed nitrogen much more quickly than the impregnation-type catalyst. From these results and using the criteria of chemical and mathematical feasibilities, a network for the hydrodenitrogenation of decahydroquinoline has been hypothesized. (ERA citation 05:035890)

LASL-80-26 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Thermochemical Cycles. A New Method of Producing Hydrogen.
K. E. Cox. Aug 80, 4p
Contract W-7405-ENG-36

Many approaches, all designed to produce hydrogen rapidly, have been tried. The effects of catalysts, organic solvents, complexing agents, and molten salts are being investigated, and they contribute to the basic understanding of thermochemical cycles for hydrogen production. Recently, this work has been broadened to include reactions in the temperature range of 1000 to 2000 exp 0 C (1800 to 3600 exp 0 F), which may be available from sources such as high-temperature solar collectors or future fusion machines. (ERA citation 05:034619)

MTCH-PR-6-79 PC **A02**/MF **A01**
Mining Technology Clearing House, Tamworth (England).
In-Situ Coal Conversion.
1979, 17p

No abstract available.

SAND-79-0732 PC **A03**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Interaction Effects of Storage Caverns in Salt.
P. D. Hilton, J. R. Tillerson, S. E. Benzley, and M. H. Gubbels. Aug 80, 46p
Contract AC04-76DP00789

The US Strategic Petroleum Reserve program for crude oil stockpiling utilizes some existing solution mined caverns in Gulf Coast salt domes. Geomechanical analyses are impotant tools used to assess the structural stability of these caverns. This report addresses the ineractions between adjacent caverns which result from maintaining different pressures in the caverns. Finite element models of two adjacent caverns are analyzed for four different cavern spacings. The brine pressure is simulated in one cavern while the pressure in the adjacent cavern ranges from that of the oil head to atmospheric conditions. Stress distributions and deformed profiles of the caverns are plotted for the

conditions simulated. Since the tensile strength of salt is low (typically 100 to 300 psi), regions in which tensile stresses occur are considered to have a significant probability of slabbing. A preliminary recommendation is made to maintain similar pressures to adjacent caverns in which the pillar thickness/cavern diameter ratio of the web between caverns is less than 0.5 unless cavern specific assessments indicate that the potential for pillar slabbing is minimal. (ERA citation 05:035981)

SLL-73-0061 PC **A02**/MF **A01**
Sandia Labs., Livermore, CA.
Hybrid Processes for Extraction of Hydrogen from Water.
S. W. Zehr, J. M. Brierly, and M. I. Baskes. Sep 73, 13p
Contract AC04-76DP00789

The need is clear to find an economical, clean-burning substitute for fossil fuels to reduce pollution and conserve fossil hydrocarbon resources. An attractive candidate for meeting this need is hydrogen produced from only water and energy. Conventional direct electrolysis for this purpose suffers from the low efficiency of the heat-to-electricity conversion step. Thus there is a need to develop more efficient and lower-cost alternative production processes. Cyclic multistep thermochemical processes are being considered by others for this purpose; however, the most attractive of these candidates use expensive intermediate substances which, even though recycled in the process, lead to very large inventory and capital requirements. Because of the large scale of projected energy requirements, additional effort is warranted to find processes involving cheaper intermediate substances and lower capital costs if hydrogen as a fuel is to have a significant beneficial impact. (ERA citation 05:036197)

UCRL-Trans-11617 PC **A02**/MF **A01**
First Data on Underground Coal Gasification at the Experimental Gas Generator of the Angren Podzemgaz Station.
G. O. Nusinov, and G. P. Zybalova. 1962, 16p
Contract W-7405-ENG-48
A, Podzemn. Gazif. Uglei, 6 P3-10 1962.

The following conclusions were developed from this field test: The low gas permeability of the coal seam and the tendency of the coal toward self-ignition restrict the use of percolation linkage of boreholes at the Angren Podzemgaz Station. The method of hydraulic fracture of the coal seam at Angren can effect an increase in rate and improvement of the flow indices of the linking process. When hydraulic fracture was carried out wih a water supply rate of 2 m exp 3 /min, channels were formed linkage of which was carried out mainly with medium-pressure air - at up to 7.5 at - at a rate of over 1.8 running meters/day. Upon partial hydraulic fracture, when for various reasons the process did not bring about a sharp decrease in the hydraulic resistance of the section, water supply to the coal seam led to an increase in steam permeability; fire linkage of the boreholes to the fire face then proceeded at a rate close to 2 m/day, with air consumption of 5,400-13,300 Nm exp 3 per running meter of channel under a high-pressure and later a medium-pressure air flow. Gasification of the coal seam in the channels formed by using hydraulic fracture of the seam proceeded stably. Gasification was carried out at limited air flow rates - up to 2500 Nm exp 3 /hr - with production of gas whose weighted mean combustion heat was 913 kcal/Nm exp 3 over the entire period, and 1070 kcal/Nm exp 3 over the period when the air flow was supplied at a rate of over 1500 Nm exp 3 /hr. (ERA citation 05:035884)

21E. Jet and Gas Turbine Engines

AD-A091 011/7 PC **A04**/MF **A01**
Federal Aviation Administration Technical Center, Atlantic City, NJ.
Exhaust Emissions Characteristics and Variability for Pratt and Whitney JT8D-7A Gas Turbine Engines Subjected to Major Overhaul and Repair.
Final rept. Nov 78-Feb 79,
Eric E. Becker, Gary Frings, and William C. Cavage. Sep 80, 55p Rept no. FAA-CT-79-53

Seven Pratt and Whitney Aircraft (PWA) JT8D-7A turbofan engines were tested at Kennedy International Airport, New York, to evaluate exhaust emissions characteristics and data variability after overhaul. The measured data show that the engines tested did not meet the Environmental Protection Agency (EPA) emission standards. A comparison of the measured data, obtained from the seven overhauled engines evaluated under this program, with new engine data obtained from PWA show that there is a great deal of similarity between the two sets of data. Differences shown in this report between new engine and overhauled engine data are due to the quantity of the engines sampled; the new engine data represent a larger sample size. Satisfactory data can be measured by using the test procedures, instrumentation, and equipment defined in this report. (Author)

AD-A091 120/6 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Experimental Performance and Analysis of 15.04-Centimeter-Tip-Diameter, Radial-Inflow Turbine with Work Factor of 1.126 and Thick Blading.
Technical paper,
Kerry L. McLallin, and Jeffrey E. Haas. Oct 80, 21p NASA-E-391, NASA-TP-1730, USAAVRADCOM-TR-80-09

The aerodynamic design, the experimental performance, and an internal loss breakdown are presented for a 15.04-cm-tip-diameter, radial-inflow turbine. The design application is to drive a two-stage, 10-to-1 pressure ratio compressor with a mass flow of 0.952 kg/sec and a rotative speed of 70,000 rpm. The turbine inlet temperature was 1478 K, and the turbine was designed with blades thick enough for internal cooling passages. The rotor tip diameter was limited to 86 percent of optimum in order to obtain a reduced-tip-speed design. The turbine was fabricated with solid, uncooled blading and tested in air at nominal inlet pressure and temperature of 1.379 x 100,000 N/sq. m and 322.2 K, respectively. Experimental results indicated the turbine total efficiency to be 5.3 points less than design. Analysis of these results has indicated the deficit in performance to be due to stator secondary flow losses, vaneless-space surface friction losses, and trailing-edge wake mixing losses. (Author)

AD-A091 157/8 PC **A05**/MF **A01**
Pennsylvania State Univ., State College. Applied Research Lab.
Development of a Fast-Response Total Pressure Probe for Use in an Axial Flow Fan.
Technical memo.,
J. A. Spivak. 22 Oct 79, 96p Rept no. ARL/PSU/TM-79-182
Contract N00014-75-C-1143

This fast-response total pressure probe is intended for use in the study of unsteady flows in turbomachines. Emphasis is on the design and calibration of this probe, which uses a temperature-compensated transducer to obtain both the AC and DC components of the fluctuations. A description of the calibration procedure and calibration device, a Galton Whistle, employed to determine the time-dependent response of this probe is presented. In addition, typical data demonstrating the use of this probe in an axial flow fan are discussed.

AD-B031 555/6 PC **A09**/MF **A01**
Boeing Aerospace Co., Seattle, WA.
Rapid Evaluation of Propulsion System Effects. Volume IV. Library of Configurations and Performance Maps.
Final rept. Jul 77-Jul 78,
W. H. Ball. Jul 78, 198p AFFDL-TR-78-91-VOL-4
Contract F33615-77-C-3085
See also Volume 1, AD-B031 629L.
Distribution limitation now removed.

An essential element of the PIPSI and DERIVP computer procedures is the use of maps of standardized format to represent the inlet and nozzle/aftbody performance characteristics. This volume of the contract documents contains the existing library of performance characteristics for inlets and nozzle/aftbodies. It also contains descriptions of the configurations and the baseline derivative parameters. The plotted data maps and derivative parameters contained in this document represent the data that are converted (in the form of data tables) into computer disk files for rapid use by the calculation procedures of the PIPSI and DERIVP computer programs.

AD-B031 629/9 PC **A06**/MF **A01**
Boeing Aerospace Co., Seattle, WA.
Rapid Evaluation of Propulsion System Effects. Volume I.
Final rept. Jul 77-Jul 78,
W. H. Ball, and T. E. Hickcox. Jul 78, 125p
AFFDL-TR-78-91-VOL-1
Contract F33615-77-C-3085
See also Volume 4, AD-B031 555L.
Distribution limitation now removed.

This report presents the results of a research program to develop computerized preliminary analysis procedures for calculating propulsion system installation losses. These losses include inlet and nozzle internal losses and external drag losses for a wide variety of subsonic and supersonic aircraft configurations up to Mach 3.5. The calculation procedures used in the computer programs, which were largely developed from existing engineering procedures and experimental data, are suitable for preliminary studies of advanced aircraft configurations. Two interactive computer programs were developed during the contract: (1) A propulsion installation effects program that calculates installed performance, using input maps of inlet and nozzle/aftbody characteristics for specific configurations, and (2) a 'derivative' program that allows the user to generate new sets of input maps by perturbations to the geometries of the basic input maps. The work accomplished during the contract is documented in four separate volumes. Volume I is a Final Report discussing the analysis methods and data used to develop the programs, and major technical observations from the study. Volume II is a PIPSI Users Manual, containing documentation of the interactive propulsion installation program. Volume III is the Derivative Procedure Users Manual, documenting the methods and usage of the derivative procedure. Volume IV is the library of input maps. (Author)

AD-B031 766/9 PC **A06**/MF **A01**
Boeing Aerospace Co., Seattle, WA.
Rapid Evaluation of Propulsion System Effects. Volume II. PIPSI Users Manual.
Final rept. Jul 77-Jul 78,
W. H. Ball, and R. A. Atkins, Jr. Jul 78, 104p
AFFDL-TR-78-91-VOL-2
Contract F33615-77-C-3085
See also Volume 3, AD-B031 768L.
Distribution limitation now removed.

For abstract see AD-B031 629.

AD-B031 768/5 PC **A08**/MF **A01**
Boeing Aerospace Co., Seattle, WA.
Rapid Evaluation of Propulsion System Effects. Volume III. Derivative Procedure (DERIVP) Users Manual.
Final rept. Jul 77-Jul 78,
T. E. Hickcox, R. A. Atkins, Jr., and W. H. Ball. Jul 78, 159p AFFDL-TR-78-91-VOL-3
Contract F33615-77-C-3085
See also Volume 4, AD-B031 555L.
Distribution limitation now removed.

For abstract see AD-B031 629.

DOE/ET/12293-T1 PC **A02**/MF **A01**
Battelle Columbus Labs., OH.
Mechanical Property Improvement of Protective Coatings for Turbine Engines Using Coal-Derived Fuels. Final Report.
H. A. Beale. 1 Sep 80, 21p
Contract AC03-78ET12293

Nb-NbC and Nb-NbB sub 2 coatings were studied to determine how thermal expansion differences between a metal matrix and a dispersed phase affect the coating properties. Nb-NbC and Nb-NbB sub 2 coatings were deposited by dual-source electron beam evaporation. Transmission Electron Microscopic (TEM) examination of the deposited coatings revealed that the NbC and NbB sub 2 in

the coating was randomly dispersed with particle sizes of less than 50 A. The effect of such finely dispersed particles on the Peierls stress in the coating was found to have negligible impact on the coating properties. (ERA citation 05:036944)

N81-10067/9 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Comparisons of Four Alternative Powerplant Types for Future General Aviation Aircraft.
T. J. Wickenheiser, G. Knip, R. M. Plencner, and W. C. Strack. Oct 80, 50p NASA-TM-81584, E-561

Recently completed NASA sponsored conceptual studies were culminated in the identification of promising new technologies for future spark ignition, diesel, rotary, and turbine engines. The results of a NASA in-house preliminary assessment study that compares these four powerplants types in several general aviation applications are reported. The evaluation consisted of installing each powerplant type in rubberized aircraft which are sized to accomplish fixed missions. The primary evaluation criteria include projected aircraft cost, total ownership cost, and mission fuel.

PB81-114373 PC **A06**/MF **A01**
Volkswagenwerk A.G., Wolfsburg (Germany, F.R.).
Entwicklung von keramischen Turbinenbauteilen fuer Automobilgasturbinen (Development of Ceramic Components for Automotive Gasturbine Application),
Manfred Langer, and Johann Siebels. Dec 79, 111p BMFT-FB-T-79-61
Also pub. as ISSN-0340-7608. Text in German, abstract in English.

The use of ceramic materials for gasturbine components would permit an increase of the gas inlet temperature to 1623 K which in turn could lower fuel consumption and increase the power/whight ratio for an engine. Volkswagen is corporating with the ceramic industry in the development of ceramic components for automotive gasturbine application. The materials investigated were silicon nitride and silicon carbide. Combustion chambers and nozzle rings were tested for several hours without failure. Prototype rotors reached circumferential speeds of 450 m/s at room temperature and survived thermal shocks of 600 K/s. Future developments of materials should be directed towards improved consistency of quality and increase of component service life. Designs must be developed to result in lower tensil stresses before ceramic components can become a practical possibility in gasturbine engines.

21G. Reciprocating Engines

PB81-121949 PC **A02**/MF **A01**
Environmental Protection Agency, Ann Arbor, MI. Standards Development and Support Branch.
Report Impact Analysis for the Proposed Heavy-Duty Diesel Particulate Regulation.
Technical rept.,
Daniel Heiser. Aug 80, 8p EPA-AA-SDSB-80-10

EPA is preparing to propose a particulate emission standard for 1985 and later model year heavy-duty diesel vehicles. Under Executive Order 12044, Improving Government Regulations, government agencies must report new reporting burdens or record keeping requirements before new significant regulations are adopted. EPA requires a 'report impact analysis' to comply with executive Order 12044. This analysis has been performed in fulfillment of this requirement. This report will examine the information already required and determine the additional information that will have to be submitted. Also to be addressed are the reasons for requesting this additional information.

PB81-121964 PC **A02**/MF **A01**
Environmental Protection Agency, Ann Arbor, MI. Standards Development and Support Branch.
The Aftermarket Costs of Heavy-Duty Diesel Mufflers.
Technical rept.,
Daniel Heiser. Jul 80, 14p EPA-AA-SDSB-80-13

EPA is preparing to propose a heavy-duty diesel particulate emission standard. One possible control technique is the trap-oxidizer. The addition of a trap-oxidizer will require the use of an exhaust system that will last the lifetime of a vehicle (i.e., a stainless steel system). The trap-oxidizer has also been shown to reduce engine noise as well as current mufflers. Thus, its use should eliminate the need for the muffler. This elimination would reduce maintenance costs, since the muffler would no longer need to be replaced. These savings would need to be taken into account when determining the net cost per vehicle of adding a trap-oxidizer. To estimate these savings, the aftermarket costs of mufflers must be known. Representative aftermarket muffler costs will thus be estimated in this report for the various heavy-duty vehicle classes.

21H. Rocket Motors and Engines

N81-10006/7 PC **A09**/MF **A01**
Pennsylvania State Univ., University Park.
Analytical and Experimental Study of Mean Flow and Turbulence Characteristics inside the Passages of an Axial Flow Inducer.
Final Report.
C. A. Gorton, and B. Lakshminarayana. Nov 80, 179p NASA-CR-3333, PSU-AERSP-74-2
Contract NGL-39-009-007

The inviscid and viscid effects existing within the passages of a three bladed axial flow inducer operating at a flow coefficient of 0.065 are investigated. The blade static pressure and blade limiting streamline angle distributions were determined and the three components of mean velocity, turbulence intensities, and turbulence stresses were measured at locations inside the inducer blade passage utilizing a rotating three sensor hotwire probe. Applicable equations were derived for the hotwire data reduction analysis and solved numerically to obtain the appropriate flow parameters. The three dimensional inviscid flow in the inducer was predicted by numerically solving the exact equations of motion, and the three dimensional viscid flow was predicted by incorporating the dominant viscous terms into the exact equations. The analytical results are compared with the experimental measurements and design values where appropriate. Radial velocities are found to be of the same order as axial velocities within the inducer passage, confirming the highly three dimensional characteristic of inducer flow. Total relative velocity distribution indicate a substantial velocity deficiency near the tip at mid-passage which expands significantly as the flow proceeds toward the inducer trailing edge. High turbulence intensities and turbulence stresses are concentrated within this core region. Considerable wake diffusion occurs immediately downstream of the inducer trailing edge to decay this loss core. Evidence of boundary layer interactions, blade blockage effects, radially inward flows, annulus wall effects, and backflows are all found to exist within the long, narrow passages of the inducer.

21I. Rocket Propellants

AD-A091 078/6 PC **A19**/MF **A01**
Aerojet Liquid Rocket Co., Sacramento, CA.
Low-Thrust Bipropellant Engine Technology.
Final technical rept. Sep 77-Jul 80,
L. Schoenman, and R. L. Friedman. Aug 80, 428p AFRPL-TR-80-47
Contract F04611-77-C-0053

The design, fabrication and hotfire test of a low-thrust, 0.5 lbF class bipropellant rocket engine, capable of providing very small, precisely repeatible impulse bits and long, high-performance, steady-state burns, was undertaken in a three-phase program. Phase I, Analysis and Design, consisted of detailed studies and tradeoff analyses of general mission/system requirements versus engine assembly parametrics and the development of the overall design approach. Phase II, Design Verification, consisted of component (valve, injector and chamber) fabrication and development testing for the demonstration point design. Phase III, Demonstration, consisted of engine fabrication and demonstration of the point design. While a 100% achievement of all contract goals was elusive within the resources provided, significant advancements in small engine technology were made that prove the feasibility of developing a 0.5 lbF class bipropellant engine. Steady-state durability of 8 hours of firing without failure has been demonstrated, along with a small impulse bit of less than 0.005 + or - .0005 lbF sec. It is reasonable to predict that the same engine that ran 8 hours steady-state will be able to accomplish the 10 hour life goal based on its excellent postfire condition.

N81-10203/0 PC **A04**/MF**A01E**
Technische Hogeschool, Delft (Netherlands). Dept. of Aeronautical Engineering.
The Double Helmholtz Resonator as a Possible Tool for the Determination of the Response Function of Solid Rocket Propellants in the Low Frequency Range.
H. F. R. Schoeyer. Mar 80, 51p VTH-M-365

A theoretical analysis of a double Helmholtz resonator (HR) is presented. The laboratory utilization of a HR burner is recommended to measure the admittance function of propellants in a wide frequency range. The performance of a burner is analyzed and the quantities to be measured in order to deduct meaningful information about the propellant from test runs are indicated. The burner may use T-burner components. Its use with and without a surge tank is mentioned.

22.
SPACE TECHNOLOGY

22A. Astronautics

AD-A091 081/0 PC **A08**/MF **A01**
Stanford Univ., CA. Dept. of Computer Science.
Modelling the Environment of an Exploring Vehicle by Means of Stereo Vision.
Doctoral thesis,
Donald Bernard Gennery. Jun 80, 154p Rept nos. STAN-CS-80-805, AIM-339
Contract MDA903-80-C-0102

This dissertation describes research involving vision techniques which would be useful in an autonomous exploring vehicle, such as a Mars rover. These techniques produce a description of the surroundings of the vehicle in terms of the position, size, and approximate shape of objects, and can match such scene descriptions with others previously produced. The information produced is thus useful both for navigation and obstacle avoidance. The techniques operate by using three-dimensional data which they can produce by means of stereo vision from stereo picture pairs or which can be obtained from a laser rangefinder. The research thus divides conveniently into two portions: stereo mapping and three-dimensional modelling and matching. The stereo mapping techniques are designed to be suitable for the kind of pictures that a Mars rover might obtain and to produce the kind of data that the modelling techniques need. These stereo techniques are based upon area correlation and produce a depth map of the scene. Emphasis is placed upon extraction of useful data from noisy pictures and upon the estimation of the accuracy of the data produced. Included are the following: a self-calibration method for computing the stero camera model (the relative position and orientation of the two camera positions); a high-resolution stereo correlator for producing accurate matches

with accuracy and confidence estimates, which includes the ability to compensate for brightness and contrast changes between the pictures; a search technique for using the correlator to produce a dense sampling of matched points for a pair of pictures; and the computation of the distances to the matched points, including the propagation of the accuracy estimates.

N76-73893/9 PC **A16**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Exploring in Aerospace Rocketry: An Introduction to the Fundamentals of Rocketry Developed at the NASA Lewis Research Center, Cleveland, Ohio.
1971, 365p NASA-EP-88

Rockets have been used for centuries. By 1000 B.C., and perhaps as early as 3000 B.C., the Chinese had developed rockets for display and for use in warfare. As early as the 2nd century A.D., science fiction was written about imaginary rocket trips to the Moon. Early in the 20th century, Robert H. Goddard began a study of the use of rockets for reaching extreme altitudes, and his work laid the foundation for much of our present rocket technology. The development of rockets sophisticated enough to lift men to the Moon and return them to Earth has captured the attention of people everywhere. The study of the principles of rocketry is quite appropriate, therefore, for those who wish to understand the space age. This book could be used as a curriculum resource for teachers in high schools and colleges. It might also be helpful to curriculum committees and textbook writers. It discusses many topics which teachers in various disciplines can use to enrich or supplement their regular courses. Many applications of the laws of physics are evident throughout the chapters. Examples of applied mathematics are abundant. Applications of chemistry will be found in the chapters on thermodynamics, materials, and propellants. Material related to biology will be found in the chapter on biomedical engineering. In general, these applications will be most meaningful with students of high ability. The book could be used as the basis for an elective course in rocketry. Teachers who are interested in this possibility will want to do some reading in related literature in order to identify numerical problems which can be used to reinforce the concepts presented.

N78-75914/9 PC **A14**/MF **A01**
RCA Astro Electronics Div., Princeton, NJ.
TIROS-N System Definition Study Report, Submission 2, Volume II.
Jan 75, 320p NASA-CR-156759
Contract NAS5-20644
Portions of this document are not fully legible.

No abstract available.

N79-74782/0 PC **A02**/MF **A01**
Bellcomm, Inc., Washington, DC.
Mission Description for SAA Alternate Mission AS-209,
K. E. Martersteck, and H. A. Watson. 20 Jun 66, 11p NASA-CR-158192

This document presents detailed objectives, the preliminary reference trajectory requirements, and the general configuration of Apollo-Saturn IB Alternate Mission 209. Subsequent revisions will include a more complete description of objectives and requirements for measurements and observations. Space vehicle performance data and constraints required for preliminary reference trajectory development will be provided in the appropriate mission data specification.

N81-10084/4 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Mission Operation Report: Fitsatcom-D Launch.
30 Oct 80, 22p NASA-TM-82218, M-0-491-202-80-80-04

FLTSATCOM is an advanced Earth satellite designed to provide extensive communication capability for the USAF and USN. The satellites are to be placed in synchronous, near equatorial orbits and provide 23 UHF and one SHF channels. Mission objectives, mission description, spacecraft description, launch vehicle configuration, and organization and responsibilities are described.

N81-10088/5 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Greenbelt, MD. Goddard Space Flight Center.
Launch Summary for 1979.
R. W. Vostreys. Aug 80, 36p NASA-TM-82273, NSSDC/WDC-A-R&S-80-08

Spacecraft launching for 1979 are identified and listed under the categories of (1) sounding rockets, and (2) artificial Earth satellites and space probes. The sounding rockets section includes a listing of the experiments, index of launch sites and tables of the meanings and codes used in the launch listing.

N81-10089/3 PC **A04**/MF **A01**
National Aeronautics and Space Administration, Greenbelt, MD. Goddard Space Flight Center.
National Space Science Data Center (Nssdc) Data Listing.
Aug 80, 56p NASA-TM-82274, NSSDC/WDC-A-R&S-80-10

Satellite and nonsatellite data available from the National Space Science Data Center are listed. The Satellite Data listing includes the spacecraft name, launch date, and an alphabetical list of experiments. The Non-Satellite Data listing contains ground based data, models, computer routines, and composite spacecraft data. The data set name, data form code, quantity of data, and the time space covered are included in the data sets of both listings where appropriate. Geodetic tracking data sets are also included.

N81-10894/6 PC **A03**
Societe Nationale Industrielle Aerospatiale, Les Mureaux (France). Div. Systemes Balistiques et Spatiaux.
Example of a Policy for Developing Space Technology Spin-Offs in Other Fields Exemple d'Une Politique de Valorisation de Retombees Technologiques Spatiales dans d'Autres Domaines.
D. G. Compard. 1980, 35p SNIAS-801-422-108
Text in French. Presented at Intern. Colloq. On Econ. Effects of Space and Other Adv. Technol., Strasbourg, Apr. 1980.

Spin-offs fall into two categories: direct products available when satellites are put into orbit with applications in such areas as Earth communication stations, computer terminals, television stations and indirect products with specific applications in special industrial or commercial sectors. Spin-offs related to the oil, nuclear, and solar energy industries are presented together with other applications in medicine, heavy load braking systems (airplanes, tanks, etc.), chemical products, vehicle shielding, gas storage, magnetic bearings, gyroscopic energy storage systems, safety systems, and special materials.

22B. Spacecraft

AD-A091 226/1 PC **A03**/MF **A01**
Science Applications, Inc., El Segundo, CA.
Spacecraft Charging Model Validation/Test Evaluation Status Report, CDRL A009,
Edward E. O'Donnell. 11 Sep 80, 30p
Contract F04701-80-C-0009

One of the primary objectives of the cooperative NASA/Air Force Spacecraft Charging Investigation is to ensure that validated analytical models and test techniques are available for the assessment of spacecraft interactions with the space environment. Models must be capable of predicting the degradation (permanent damage or anomalous behavior) of spacecraft due to the environment. Also, test techniques must be developed for the purposes of providing input data for the models, or for certifying that the spacecraft fulfills its design requirements. This report is an update to the Model Validation/Test Evaluation Status Report (CDRL 006A2) submitted August 1979 by SAI. In the past year, p78-2 data have been integrated into an environmental Atlas. NASCAP predictions have been compared with the P78-2 SSPM sample measurements. Two major electron spraying experiments have been conducted on geometric spacecraft models for which coupling predictions have been made. A quasi-static model of the SGEMP code SABER has been developed and exercised, and significant work has been reported on the emission of current during discharges.

AD-B040 219/8 PC **A03**/MF **A01**
Arnold Engineering Development Center, Arnold AFS, TN.
Aerothermal Evaluation of the Space Shuttle External Tank Thermal Protection System.
Final rept. Nov 77-Jan 79,
John O. Ievalts. Feb 79, 45p Rept no. AEDC-TSR-79-V10
Prepared in cooperation with ARO, Inc., Tullahoma, TN.
Distribution limitation now removed.

Samples of insulation materials under consideration for use on the Space Shuttle External Tank were tested to obtain material data and to evaluate their survivability at simulated flight conditions. Heat-transfer calibration data were obtained by the use of the thin-skin technique. All tests were conducted in the VKF Tunnel C. Selected results are presented to illustrate the test techniques and to show typical data obtained. (Author)

N81-10085/1 PC **A04**/MF **A01**
National Aeronautics and Space Administration, Huntsville, AL. George C. Marshall Space Flight Center.
Space Environmental Effects on Materials.
R. J. Schwinghmaer. Aug 80, 52p NASA-TM-78306

The design of long life platforms and structures for space is discussed in terms of the space environmental effects on the materials used. Vacuum, ultraviolet radiation, and charged particle radiation are among the factors considered. Research oriented toward the acquisition of long term environmental effects data needed to support the design and development of large low Earth orbit and geosynchronous Earth orbit space platforms and systems is described.

N81-10087/7 PC **A11**/MF **A01**
ISRO Satellite Centre, Peenya, Bangalore (India).
The Aryabhata Project.
U. R. Rao, and K. Kasturirangan. 1979, 239p
Submitted for Publication.

An overview of the basic features of the Aryabhata satellite, associated ground stations and a brief account of the fabrication, testing and (in orbit) performance of the satellite is presented. Results of some of the technological experiments carried out in Aryabhata are also briefly described.

N81-10090/1 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Mission Operation Report: Sbs-a/delta Launch.
S. I. Weiss. 10 Nov 80, 22p NASA-TM-82221, O-492-213-80-01

The Satellite Business Systems (SBS) domestic satellite system is described. Prelaunch information concerning the Delta launch vehicle and the SBS/Hughes spacecraft is presented. The information includes mission requirements, flight mode descriptions, and predicted orbit dispersions.

N81-10095/0 PC **A11**/MF **A01**
European Space Agency, Paris (France).
Feasibility Study of a Spacelab Subsatellite.
J. Puls. Feb 80, 246p ESA-TT-559, DLR-FB-77-67
Transl. Into English of "Durchfuehrbarkeitsanaly fuer Einen Spacelab-Subsatelliten", Rept. Dlr-FB-77-67 Dfvlr, Oberpfaffenhofen (Germany, F.R.). Dec. 1977. Original Report in German Previously Announced as N80-23352.

The feasibility of constructing a small inexpensive subsatellite for use in connection with the space shuttle program is discussed. The satellite is de-

signed to carry out various scientific experiments in orbits that are independent of the main space laboratory. A modular concept characterizes the design. Special emphasis was placed on the investigation of orbital mechanics.

N81-10100/8 PC **A10**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Viking '75 Spacecraft Design and Test Summary. Volume 1: Lander Design.
N. A. Holmberg, R. P. Faust, and H. M. Holt. Nov 80, 213p NASA-RP-1027, L-12087-V-1
2.

The Viking Mars program is summarized. The design of the Viking lander spacecraft is described.

N81-10101/6 PC **A14**/MF **A01**
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Viking '75 Spacecraft Design and Test Summary. Volume 2: Orbiter Design.
N. A. Holmberg, R. P. Faust, and H. M. Holt. Nov 80, 318p NASA-RP-1027, L-12087-V-2
2.

The design of the Viking orbiter spacecraft is described. System configuration, telecommunications, and guidance and control requirements are presented.

N81-10468/9 PC **A04**/MF **A01**
Royal Netherlands Aircraft Factories Fokker, Schiphol-Oost. Ruimtevaart.
Vibration Isolation of European Communications Satellite (Ecs) Solar Wing.
J. J. Wijker. 5 Apr 79, 48p FOK-RV-79-34

Dynamic responses of the European Communications Satellite solar wing, due to base excitation, are reduced using the technique of vibration isolation. The resonant frequency of the vibration isolator was set to 3.1 Hz. Above 5 Hz the amplification factors were less than 2.0 in a frequency range to 120 Hz.

N81-10469/7 PC **A04**/MF **A01**
Royal Netherlands Aircraft Factories Fokker, Schiphol-Oost. Ruimtevaart.
Reduction of European Communications Satellite (Ecs) Stowed Solar Array Dynamic Responses Applying Dynamic Absorbers.
J. J. Wijker. 10 May 79, 64p FOK-RV-79-43

To reduce the dynamic response of the European Communications Satellite stowed solar array, due to base excitations in a frequency range of 5-100 Hz, dynamic absorbers were used. The tuning frequency is 42.0 Hz. A reduction of 31 percent was achieved in the maximum dynamic amplification. Two amplification peaks at 30 and 51 Hz were observed.

N81-10526/4 PC **A06**/MF **A01**
Rice Univ., Houston, TX.
Electrostatic Protection of the Solar Power Satellite and Rectenna. Part 2: Lightning Protection of the Rectenna.
Final Report.
Nov 80, 124p NASA-CR-3345
Contract NAS8-33023

Computer simulations and laboratory tests were used to evaluate the hazard posed by ligtning flashes to ground on the Solar Power Satellite rectenna and to make recommendations on a lightning protection system for the rectenna. The distribution of lightning over the lower 48 of the continental United States was determined, as were the interactions of lightning with the rectenna and the modes in which those interactions could damage the rectenna. Lightning protection was both required and feasible. Several systems of lightning protection were considered and evaluated. These included two systems that employed lightning rods of different lengths and placed on top of the rectenna's billboards and a third, distribution companies; it consists of short lightning rods all along the length of each billboard that are connected by a horizontal wire above the billboard. The distributed lightning protection system afforded greater protection than the other systems considered and was easier to integrate into the rectenna's structural design.

N81-10895/3 PC **A04**/MF **A01**
Rensselaer Polytechnic Inst., Troy, NY.
Electronic and Software Subsystems for an Autonomous Roving Vehicle.
M.S. Thesis.
G. A. Doig. Oct 80, 68p NASA-CR-163668, RPI-TR-MP-76
Contract JPL-954880, Grant NSG-7369

The complete electronics packaging which controls the Mars roving vehicle is described in order to provide a broad overview of the systems that are part of that package. Some software debugging tools are also discussed. Particular emphasis is given to those systems that are controlled by the microprocessor. These include the laser mast, the telemetry system, the command link prime interface board, and the prime software.

22D. Spacecraft Launch Vehicles and Ground Support

N81-10094/3 PC **A02**/MF **A01**
Royal Netherlands Aircraft Factories Fokker, Schiphol-Oost.
Test Plan of European Communications Satellite (Ecs)/Marecs Nutation Dampers.
F. Teule. 23 Jul 79, 13p FOK-RV-79-48

An outline of the test methods that will be performed on the satellite nutation damper models is presented. Tests include weighing, visual and dimensional inspection, leak test, vibration test, constant acceleration, thermal vacuum, temperature cycle, and performance evaluation. The instruments used for each test are also described.

KEYWORD INDEX

NTIS®

Index entries in this section are selected to indicate important ideas and concepts presented in a report. When using the keyword index, be sure to look under terms narrower, broader, or related to a particular topic. Although some of the keywords are not selected from a controlled vocabulary of terms, most of them have been selected from the DoD, DoE, NASA, or NTIS controlled vocabularies. The entries are arranged by keyword and then by the NTIS order number.

SAMPLE ENTRY

FAST FOURIER TRANSFORMATIONS
Computation of Hankel Transforms Using the Fast-Fourier Transform Algorithm.
PB80-104045 33

Keyword term
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NTIS order number Page number

173RD AIRBORNE BRIGADE
Lessons Learned, Operation Robin,Headquarters, 173RD Airborne Brigade (Separate).
AD-388 135 955

1ST CAVALRY DIVISION
Lessons Learned, Headquarters, 1ST Cavalry Division (Airmobile).
AD-388 156 955

1ST INFANTRY DIVISION
Army Operation Conducted by Headquarters, 1st Infantry Division.
AD-388 138 955

ABSORBERS (MATERIALS)
Recovery of Volatile Organics from Sorbent Tube Sampling Systems.
AD-A090 954/9 870

ABSORPTION
A Model for Decreasing Hydrogen Absorption in Metals Applicable to Ion Implanted Membranes.
AD-A091 294/9 871

ABSORPTION SPECTRA
Thallium Mercury Laser Development.
AD-A090 840/0 991

Reprint: New Infrared Absorption Bands of Sodium Vapor.
AD-A090 998/6 870

The Spectrum of N2O Between 800 and 5200 cm(-1).
N81-10615/5 874

ABSTRACTS
Catalogue of Australian Army Psychology Corps Research Projects. 1979.
AD-A091 374/9 848

ACCELERATED TESTING
Reprint: Effect of Accelerated Growth Rate (1-5 micrometers/h) on Molecular Beam Epitaxial GaAs Using Si as a Dopant.
AD-A090 988/7 987

ACCELERATOR BREEDERS
APEX Accelerator Cycle for Transmutation of Long-Lived Fission Wastes.
BNL-26282 972

ACCELERATORS
Production and Attenuation of Neutrons Created by Protons, Deuterons and Alphas of GeV Energy in Shielding Concretes.
CEA-CONF-4673 971

ACCIDENT INVESTIGATIONS
An Analysis of Accidents Involving Towboat-Barge Combinations on Selected Inland Waterways of the United States.
AD-A091 054/7 945

ACCIDENTS
Post Accidental Heat Removal (PAHR): European Program. Fundamental, Experimental, and Theoretical Work on the PAHR Situation.
N81-10831/8 979

ACCOUNTING
Safeguards Material Control and Accounting Program: Quarterly Report January-March 1980.
NUREG/CR-0849-V-1-2 982

ACETYLENE
Fate of Fuel-Sulfur in Backmixed Combustion Systems. Final Report, August 1979-January 1980.
FE-2252-15 873

ACID RAIN
Geological and Hydrochemical Sensitivity of the Eastern United States to Acid Precipitation.
BNL-51189 880

ACOUSTIC ARRAYS
Research in Distributed Underwater Acoustic Arrays.
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A Method of Reducing Bearing Errors in Horizontal Linear Hydrophone Arrays in Shallow Water.
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AD-A090 873/1 894

ACOUSTIC DETECTION
Acoustically Scanned Optical Imaging Devices.
AD-A090 839/2 961

ACOUSTIC FILTERS
Correction Procedures for Aircraft Noise Data. Volume III. Filter Effects.
AD-A091 016/6 986

ACOUSTIC MATERIALS
Microwave Acoustics Handbook. Volume 3. Bulk Wave Velocities.
AD-A090 947/3 986

ACOUSTIC PROPAGATION
Analytical Characteristics Methods: Applications.
N81-10011/7 826

ACOUSTIC REFLECTION
Contribution of Antisymmetric and Symmetric Waves to the Reflection of Sound in a Fluid by a Thick, Homogeneous Plate.
AD-A091 233/7 987

ACOUSTIC REFRACTION
Reprint: Effects of Temperature-Dependent Anisotropy in RAC Devices and a Cut of Quartz for a Temperature-Compensated RAC.
AD-A090 871/5 986

ACOUSTIC SCATTERING
Acoustic Radiation Calculations Calcul du Rayonnement Acoustique.
N81-10810/2 987

ACOUSTOOPTICS
Acoustically Scanned Optical Imaging Devices.
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ACTINIDE NUCLEI
FISPIN - A Computer Code for Nuclide Inventory Calculations.
ND-R-328(R) 982

ACTINIDES
Multigram Group Separation of Actinide and Lanthanide Elements by LICI-Based Anion Exchange.
CONF-800814-15 969

Actinide Partitioning-Transmutation Program Final Report. VII. Long-Term Risk Analysis of the Geologic Repository.
ORNL/TM-6987 974

ACTIVATION ANALYSIS
Non-Destructive Determination of Trace-Element Concentrations. Annual Progress Report.
DOE/ER/05173-12 872

ACUPUNCTURE
Reprint: Clinical Analysis of 1,000 Cases of Cesarean Section Under Acupuncture Anesthesia.
PB81-116329 856

Reprint: Clinical Studies on Acupuncture Anesthesia in Lung Resection.

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ADAPTIVE FILTERS
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Reprint: The Platelet of the Newborn Infant - Adenine Nucleotide Metabolism and Release.
AD-A090 994/5 865

ADHESIVE BONDING
Evaluation of Adhesives for Hybrid Microcircuits.
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High Temperature Bonding Techniques for Solar Cell Array.
AD-B028 686/4 902

ADMINISTRATIVE PERSONNEL
Medical Administrative Career Ladder, AFSC 906XO.
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ADMISSION (HEALTH FACILITIES)
A Utilization Study of the Nursing Service Personnel in Outpatient and Admission Service, Veterans Administration Hospital, Cincinnati, Ohio,
PB81-122053 859

ADRENAL GLANDS
Radioiodine Labelling of Tyramin Derivatives of Some Digitalis Glycosides and Their Aglyka for the Scintiscanning of the Adrenal Glands.
INIS-mf-5584 855

ADSORBENTS
Support Studies in Fluidized-Bed Combustion. Annual Report, October 1978-September 1979.
ANL/CEN/FE-79-14 930

AERATION
Calibration and Potential Uses of a Digital Water-Quality Model for the Arkansas River in Pueblo County, Colorado.
PB81-124760 881

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National Space Science Data Center (Nssdc) Data Listing.
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Theoretical Determination of Subsonic Oscillatory Airforce Coefficients for Fin-Tailplane Configurations.
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AERODYNAMIC CONFIGURATIONS
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Design of a Lateral Stability Augmentation System for the F-106 to Improve Lateral Handling Qualities During Tracking.
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AEROMEDICAL EVACUATION
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AERONAUTICAL ENGINEERING
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AD-A091 109/9 828

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Infrared Emission by an Aerosol Cloud.
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Investigations of the Meteorological Influence on Aerosol Transmission in the 0.5 - 14 Micrometer Wavelength Range.
N81-10648/6 832

Environmental Radiation Safety: Source Term Modification by Soil Aerosols. Interim Report.
PNL-3497 976

AEROSPACE ENGINEERING
Exploring in Aerospace Rocketry: An Introduction to the Fundamentals of Rocketry Developed at the NASA Lewis Research Center, Cleveland, Ohio.
N76-73893/9 1010

NASA Aerospace Pressure Vessel Safety Standard.
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Space Environmental Effects on Materials.
N81-10085/1 1010

AEROSPACE INDUSTRY
Example of a Policy for Developing Space Technology Spin-Offs in Other Fields Exemple d'Une Politique de Valorisation de Retombees Technologiques Spatiales dans d'Autres Domaines.
N81-10894/6 1010

AEROSPACE TECHNOLOGY TRANSFER
Example of a Policy for Developing Space Technology Spin-Offs in Other Fields Exemple d'Une Politique de Valorisation de Retombees Technologiques Spatiales dans d'Autres Domaines.
N81-10894/6 1010

AEROTHERMODYNAMICS
Aerothermal Evaluation of the Space Shuttle External Tank Thermal Protection System.
AD-B040 219/8 1010

AFRRI REACTOR
Inspection Methods for Physical Protection. Task II. Review of Research Reactor Licensees' Physical Security Practices.
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AFWL (AIR FORCE WEAPONS LABORATORY)
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AIR FORCE ACADEMY
Cleanth Brooks at the United States Air Force Academy April 11-12, 1978,
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AIR FORCE OPERATIONS
Analysis of the 323rd Flying Training Wing Using Organizational Development and the Action Research Model: A Communications Audit.
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AIR FORCE PROCUREMENT
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Use of the Award Fee in Air Force System and Subsystem Acquisition.
AD-A091 152/9 949

Contract Incentives for Product Quality.
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USAF Acquisition Managers Quality Guide.
AD-A091 379/8 835

AIR FORCE TRAINING
Microterminal/Microfiche System for Computer-Based Instruction: Hardware and Software Development.
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AD-A091 105/7 843

Capacity of Air Force Operational Units to Conduct-the-Job Training: Development of Estimation Methodology.
AD-A091 228/7 844

Pop-Up Weapon-Delivery Maneuver: Use of Pilot Self-Assessment Data in Analysis of Critical Components.
AD-A091 229/5 844

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Lessons Learned, Headquarters, 1ST Cavalry Division (Airmobile).
AD-387 543 953 PC **A04**/MF **A01**

OACSFOR-OT-RD-T674246

Lessons Learned, Headquarters, 1ST Infantry Division.
AD-389 325 959 PC **A07**/MF **A01**

OACSFOR-OT-RD-T674248

Lessons Learned, Headquarters, 11TH Armored Cavalry Regiment.
AD-388 840 957 PC **A04**/MF **A01**

OACSFOR-OT-RD-T674249

Lessons Learned, Headquarters, 1ST Brigade101st Airborne Division.

AD-388 845 957 PC **A04/MF A01**

OACSFOR-OT-RD-T674251
Lessons Learned, Headquarters, 18TH Engineer Brigade.
AD-387 540 953 PC **A03/MF A01**

OACSFOR-OT-RD-T674253
Lessons Learned, Headquarters, 1ST Military Intelligence Battalion (Ars).
AD-387 322 952 PC **A02/MF A01**

OACSFOR-OT-RD-T674254
Lessons Learned, Headquarters, 1ST Aviation Brigade.
AD-387 506 953 PC **A02/MF A01**

OACSFOR-OT-RD-T674255
Lessons Learned, Headquarters, 9TH Infantry Division.
AD-388 749 957 PC **A04/MF A01**

OACSFOR-OT-RD-T674257
Lessons Learned, Headquarters, 173D Airborne Brigade (Sep).
AD-388 578 957 PC **A03/MF A01**

OACSFOR-OT-RD-T674260
Lessons Learned, Headquarters, US Army Support Command Cam Ranh Bay.
AD-388 166 956 PC **A04/MF A01**

OACSFOR-OT-RD-T674261
Lessons Learned, Headquarters, Americal Division Support Command.
AD-387 683 955 PC **A02/MF A01**

OACSFOR-OT-RD-T674263
Lessons Learned, Headquarters Americal Division Artillery.
AD-388 478 957 PC **A02/MF A01**

OACSFOR-OT-RD-T674264
Lessons Learned, Headquarters, 3D Brigade Task Force,4TH Infantry Division.
AD-388 976 958 PC **A03/MF A01**

OACSFOR-OT-RD-T674272
Lessons Learned, Headquarters, 5TH Transportation Command.
AD-387 467 950 PC **A02/MF A01**

OACSFOR-OT-RD-T674275
Lessons Learned, Headquarters, United States Army Vietnam.
AD-387 328 952 PC **A09/MF A01**

OACSFOR-OT-RD-66X001
Operation Abilene, Headquarters, 1ST Infantry Division.
AD-387 599 954 PC **A07/MF A01**

OACSFOR-OT-RD-66X009
Operation Attleboro, Headquarters, 173D Airborne Brigade (Separate),
AD-387 602 954 PC **A02/MF A01**

OACSFOR-OT-RD-66X011
Lessons Learned, Operation Attleboro, 25th Infantry Division.
AD-387 618 954 PC **A03/MF A01**

OACSFOR-OT-RD-66X012
Lessons Learned, Operation Attleboro, Headquarters, 25TH Infantry Division.
AD-387 619 954 PC **A03/MF A01**

OACSFOR-OT-RD-66X014
Lessons Learned, Headquarters, Operation Atlanta, 11TH Armored Cavalry Regiment.
AD-387 620 954 PC **A04/MF A01**

OACSFOR-OT-RD-66X016
Lessons Learned, Operation Atlantic City, Headquarters, 173D Airborne Brigade (Separate).
AD-387 603 954 PC **A03/MF A01**

OACSFOR-OT-RD-66X017
Operation Aurora I, Headquarters, 173D Airborne Brigade (Separate).
AD-385 753 951 PC **A02/MF A01**

OACSFOR-OT-RD-66X018
Aurora II,Headquarters, 173D Airborne Brigade (Separate).
AD-387 604 954 PC **A02/MF A01**

OACSFOR-OT-RD-66X038
Combat Operations after Action Report.
AD-388 133 955 PC **A02/MF A01**

OACSFOR-OT-RD-66X043
Operation El Paso II/III, Headquarters, 1ST Infantry Division.
AD-387 606 954 PC **A12/MF A01**

OACSFOR-OT-RD-66X047
Cai Be Ambush,Headquarters, Senior Advisor, Advisory Team 96,
AD-387 621 954 PC **A02/MF A01**

OACSFOR-OT-RD-66X107
Operation Hickory, Headquarters, 3D Squadron,11TH Armored Cavalry Regiment.
AD-387 607 954 PC **A03/MF A01**

OACSFOR-OT-RD-66X115
Lessons Learned 101st Airborne Division.
AD-388 882 957 PC **A03/MF A01**

OACSFOR-OT-RD-66X117
Operation Kahala, Headquarters, 2D Brigade,25TH Infantry Division.
AD-385 751 951 PC **A02/MF A01**

OACSFOR-OT-RD-66X151
Operation Lexington III. Headquarters First Battalion,18TH Infantry.
AD-386 121 952 PC **A02/MF A01**

OACSFOR-OT-RD-66X170
Operation Mastiff, from 1ST Infantry Division.
AD-386 118 951 PC **A04/MF A01**

OACSFOR-OT-RD-66X180
Lessons Learned, Operation Pickett, Headquarters, 1ST Brigade,101ST Airborne Division.
AD-387 608 954 PC **A03/MF A01**

OACSFOR-OT-RD-66X181
Headquarters, 173D Airborne Brigade (Separate), Operation 'Crimp'.
AD-388 134 955 PC **A04/MF A01**

OACSFOR-OT-RD-66X190
Lessons Learned, Operation Robin,Headquarters, 173RD Airborne Brigade (Separate).
AD-388 135 955 PC **A02/MF A01**

OACSFOR-OT-RD-66X201
Operation Seward, Headquarters 1ST Brigade101st Airborne Division.
AD-386 128 952 PC **A04/MF A01**

OACSFOR-OT-RD-66X203
Lessons Learned, Operation Sioux City, Headquarters, 173D Airborne Brigade (Separate).
AD-387 609 954 PC **A03/MF A01**

OACSFOR-OT-RD-66X211
Operation Waco Conducted by Headquarters, 173D Airborne Brigade (Separate).
AD-388 136 955 PC **A02/MF A01**

OACSFOR-OT-RD-66X231
Operation Lanikai/Search and Destroy and Pacification. 4TH Battalion, 23D Infantry,25TH Infantry Division.
AD-386 119 952 PC **A03/MF A01**

OACSFOR-OT-RD-66X232
Operation Birmingham, Headquarters, 1ST Infantry Division.
AD-387 622 954 PC **A12/MF A01**

OACSFOR-OT-RD-66X235
Lessons Learned, Headquarters, 2D Battalion,27TH Infantry (The Wolfhounds)(Operation Attleboro).
AD-387 623 954 PC **A03/MF A01**

OACSFOR-OT-RD-66X259
Lessons Learned, Operation Sante Fe, 27th Infantry.
AD-387 610 954 PC **A02/MF A01**

OACSFOR-OT-RD-67X001
Operation Junction City - HQ, 173D Airborne Brigade (Separate).
AD-385 637 951 PC **A06/MF A01**

OACSFOR-OT-RD-67X002
Operation Junction City II,Conducted by the Headquarters, 11TH Armored Cavalry Regiment.
AD-388 137 955 PC **A04/MF A01**

OACSFOR-OT-RD-67X003
Operation Ahina, Conducted by the 25TH Infantry Division.
AD-387 601 954 PC **A02/MF A01**

OACSFOR-OT-RD-67X008
Army Operation Conducted by Headquarters, 1st Infantry Division.
AD-388 138 955 PC **A05/MF A01**

OACSFOR-OT-RD-67X010
Combat after Action Report - Operation Billings, Conducted by 1ST Infantry Division.
AD-385 752 951 PC **A05/MF A01**

OACSFOR-OT-RD-67X011
Operation Ft. Nisqually, Conducted by 3RD Brigade,4TH Infantry Division.
AD-385 750 951 PC **A03/MF A01**

OACSFOR-OT-RD-67X012
Operation Dazziem Conducted by the Headquarters, 1ST Cavalry Division (Am).
AD-388 139 955 PC **A03/MF A01**

OACSFOR-OT-RD-67X014
Operation Junction City,Conducted by the Headquarters, 3D Brigade,4TH Infantry Division.
AD-388 140 955 PC **A04/MF A01**

OACSFOR-OT-RD-67X027
Lessons Learned, 101st Airborne Division.
AD-388 141 955 PC **A03/MF A01**

OACSFOR-OT-RD-67X028
Operation Gatling I and II, Headquarters, 1ST Brigade101st Airborne Division.
AD-385 754 951 PC **A02/MF A01**

OACSFOR-OT-RD-67X030
Operation SAM Houston Conducted by the 4TH Infantry Division.
AD-385 638 951 PC **A06/MF A01**

OACSFOR-OT-RD-67X059
Operation Junction City, Conducted by Headquarters, 11TH Armored Cavalry Regiment.
AD-388 154 955 PC **A04/MF A01**

OACSFOR-OT-RD-67X061
Operation Benton, Conducted by 1ST Brigade,101ST Airborne Division,
AD-385 755 951 PC **A03/MF A01**

OACSFOR-OT-RD-67X080
Combat after action report.
AD-387 624 954 PC **A04/MF A01**

OACSFOR-OT-RD-67X089
Operation Winchesterby the 173D Airborne Brigade (Separate).
AD-386 116 951 PC **A04/MF A01**

OACSFOR-OT-RD-67X098
Lessons Learned, Operation Paul Bunyan: Land Clearing Operations, 1ST Infantry Division.
AD-389 131 958 PC **A03/MF A01**

OACSFOR-OT-RD-67X112
Operation Francis Marion.
AD-387 627 954 PC **A11/MF A01**

OACSFOR-OT-RD-67X115
Operation Hoptac XVI, 2D Brigade,9TH Infantry Division.
AD-387 514 953 PC **A02/MF A01**

OACSFOR-OT-RD-67X117
Operation Greeley, Headquarters, 4TH Infantry Division.
AD-387 626 954 PC **A06/MF A01**

OACSFOR-OT-RD-67X148
Combat after Action Report - Battle of Doi Ma Creek, 3D Brigade,9TH Infantry Division,
AD-387 364 952 PC **A02/MF A01**

OACSFOR-OT-RD-67X159
Operation kolekole 25th Infantry Division.
AD-388 999 958 PC **A06/MF A01**

OACSFOR-OT-RD-67X178
Operation Akron, 11TH Armored Cavalry Regiment.
AD-389 132 958 PC **A03/MF A01**

OACSFOR-OT-RD-67X179
Lessons Learned, Operation Dallas, 11TH Armored Cavalry Regiment.
AD-389 278 959 PC **A02/MF A01**

OACSFOR-OT-RD-67X186
Lessons learned. Battle of AN Thach. 4th Infantry Division.
AD-389 011 958 PC **A02/MF A01**

OACSFOR-OT-RD-660079
Lessons Learned, Headquarters, 54TH Signal Battalion (Corps).
AD-387 369 953 PC **A05/MF A01**

OACSFOR-OT-RD-660108
Operational Report on Lessons Learned for Period Ending 30 April 1966 (Rcs Csgpo-26(Ri)), Headquarters, 1ST Logistical Command.
AD-385 756 951 PC **A06/MF A01**

OACSFOR-OT-RD-660124
Lessons Learned, Headquarters II Field Force Vietnam.
AD-388 150 955 PC **A05/MF A01**

OACSFOR-OT-RD-660151
Operational Report for Quarterly Period Ending 31 July 1966, Headquarters, 12TH Combat Aviation Group.
AD-385 757 951 PC **A03/MF A01**

OACSFOR-OT-RD-660211
Lessons Learned, Headquarters, 525TH Military Intelligence Group.
AD-388 271 956 PC **A02/MF A01**

OACSFOR-OT-RD-660215
Lessons Learned, Headquarters, 95TH Military Police Battalion.
AD-388 272 956 PC **A02/MF A01**

OACSFOR-OT-RD-660284
Operational Report, General Support Group Aircraft Maintenance and Supply, Vietnam.
AD-385 747 950 PC **A03/MF A01**

OACSFOR-OT-RD-660290
Lessons Learned, Headquarters, II Field Force Vietnam.
AD-388 151 955 PC **A04/MF A01**

OACSFOR-OT-RD-660296
Operational Report for Quarterly Period Ending 31 July 1966. Headquarters, 1ST Brigade,101ST Airborne Division.
AD-388 883 957 PC **A07/MF A01**

OACSFOR-OT-RD-660297
Lessons Learned, Headquarters, 173D Airborne Brigade (Separate).
AD-388 152 955 PC **A03/MF A01**

OACSFOR-OT-RD-660346
Lessons Learned, Headquarters, 52d Combat Aviation Battalion.
AD-510 790 959 PC **A02/MF A01**

OACSFOR-OT-RD-660402
Lessons Learned, Headquarters, 68TH Medical Group.
AD-388 273 956 PC **A02/MF A01**

OACSFOR-OT-RD-660412
Lessons Learned, Headquarters, 135TH Military Intelligence Group.
AD-388 275 956 PC **A02/MF A01**

OACSFOR-OT-RD-660413
Lessons Learned, Headquarters, 16TH Military Police Group.

AD-388 276 956 PC A02/MF A01
OACSFOR-OT-RD-660415
Lessons Learned, Headquarters, 92D Military Police Battalion.
AD-388 277 956 PC A02/MF A01
OACSFOR-OT-RD-660417
Lessons Learned, Headquarters, 95TH Military Police Battalion.
AD-388 884 958 PC A02/MF A01
OACSFOR-OT-RD-660422
Lessons Learned, Headquarters, 2D Signal Group.
AD-387 366 953 PC A04/MF A01
OACSFOR-OT-RD-660430
Lessons Learned, Headquarters, 73RD Signal Battalion (Spt).
AD-387 368 953 PC A03/MF A01
OACSFOR-OT-RD-660485
Operational Report for Quarterly Period Ending 31 October 1966 (Rcs Csfor-65, Headquarters, 1ST Logistical Command.
AD-385 838 951 PC A07/MF A01
OACSFOR-OT-RD-660511
Lessons Learned, Headquarters, 196TH Light Infantry Brigade.
AD-388 885 958 PC A03/MF A01
OACSFOR-OT-RD-670107
Lessons Learned, 1ST Military Intelligence Battalion (Ars) (Fld a).
AD-388 927 958 PC A02/MF A01
OACSFOR-OT-RD-670109
Lessons Learned, Headquarters, 16TH Military Police Group.
AD-388 278 956 PC A02/MF A01
OACSFOR-OT-RD-670110
Lessons Learned, Headquarters, 18TH Military Police Brigade.
AD-388 279 956 PC A03/MF A01
OACSFOR-OT-RD-670111
Lessons Learned, Headquarters, 92D Military Police Battalion.
AD-388 280 956 PC A02/MF A01
OACSFOR-OT-RD-670113
Lessons Learned, Headquarters, 95TH Military Police Battalion.
AD-388 886 958 PC A02/MF A01
OACSFOR-OT-RD-670118
Lessons Learned, Headquarters, 97TH Military Police Battalion.
AD-388 281 956 PC A02/MF A01
OACSFOR-OT-RD-670123
Lessons Learned, Headquarters, 21ST Signal Group.
AD-387 365 952 PC A02/MF A01
OACSFOR-OT-RD-670126
Lessons Learned, Headquarters, 39TH Signal Battalion (Spt).
AD-387 367 953 PC A02/MF A01
OACSFOR-OT-RD-670176
Lessons Learned, Headquarters, 62D Maintenance Battalion (Ds).
AD-387 089 952 PC A02/MF A01
OACSFOR-OT-RD-670179
Lessons Learned, Headquarters, 63RD Maintenance Battalion (Ds).
AD-387 090 952 PC A02/MF A01
OACSFOR-OT-RD-670182
Lessons Learned, Headquarters, 6TH Psychological Operations Battalion.
AD-387 091 952 PC A02/MF A01
OACSFOR-OT-RD-670197
Lessons Learned, HQ, 1ST Logistical Command.
AD-388 887 958 PC A08/MF A01
OACSFOR-OT-RD-670214
Lessons Learned, Headquarters, 29TH General Support Group.
AD-388 155 955 PC A03/MF A01
OACSFOR-OT-RD-670221
Lessons Learned, HQ, 196TH Light Infantry Brigade.
AD-388 888 958 PC A03/MF A01
OACSFOR-OT-RD-670222
Lessons Learned, HQ, 199TH Infantry Brigade (Sep) (Lt).
AD-388 889 958 PC A05/MF A01
OACSFOR-OT-RD-670223
Lessons Learned, HQ, 3D Brigade,4TH Infantry Division.
AD-388 890 958 PC A03/MF A01
OACSFOR-OT-RD-670226
Lessons Learned, Headquarters, 1ST Cavalry Division (Airmobile).
AD-388 156 955 PC A06/MF A01
OACSFOR-OT-RD-670228
Lessons Learned, Headquarters, II Field Force Vietnam.
AD-388 157 955 PC A06/MF A01
OACSFOR-OT-RD-670230
Lessons learned, 4th Infantry Division.
AD-388 158 955 PC A04/MF A01
OACSFOR-OT-RD-670232
Lessons Learned, Headquarters, 4TH Infantry Division.
AD-388 159 955 PC A04/MF A01
OACSFOR-OT-RD-670335
Lessons Learned, Headquarters, 18th Surgical Hospital (MA).
AD-510 929 960 PC A02/MF A01
OACSFOR-OT-RD-670343
Lessons Learned, Headquarters, 525th Military Intelligence Group.
AD-510 930 960 PC A02/MF A01
OACSFOR-OT-RD-670347
Lessons Learned, Headquarters, 92D Military Police Battalion.
AD-388 928 958 PC A02/MF A01
OACSFOR-OT-RD-670349
Lessons Learned, Headquarters, 95TH Military Police Battalion.
AD-388 282 956 PC A02/MF A01
OACSFOR-OT-RD-670350
Lessons Learned, Headquarters, 97TH Military Police Battalion.
AD-388 283 956 PC A02/MF A01
OACSFOR-OT-RD-670353
Lessons Learned, Headquarters, 720th Military Police Battalion.
AD-510 931 960 PC A02/MF A01
OACSFOR-OT-RD-670355
Lessons Learned, Headquarters, 16TH Military Police Group.
AD-388 284 956 PC A02/MF A01
OACSFOR-OT-RD-670357
Lessons Learned, Headquarters, 18TH Military Police Brigade.
AD-388 285 956 PC A03/MF A01
OACSFOR-OT-RD-670363
Lessons Learned, Headquarters, 43D Signal Battalion (Support).
AD-387 370 953 PC A02/MF A01
OACSFOR-OT-RD-670378
Lessons Learned, Headquarters, 1ST Signal Brigade (Usastratcom).
AD-387 092 952 PC A03/MF A01
OACSFOR-OT-RD-670398
Lessons Learned, Headquarters, 11th Transportation Battalion (Terminal).
AD-511 113 960 PC A03/MF A01
OACSFOR-OT-RD-670408
Lessons Learned, Headquarters, 2D Maintenance Battalion (Ds).
AD-387 093 952 PC A02/MF A01
OACSFOR-OT-RD-670413
Lessons Learned, Headquarters, 610TH Maintenance Battalion (Ds).
AD-387 094 952 PC A02/MF A01
OACSFOR-OT-RD-670415
Lessons Learned, Headquarters, 6TH Psychological Operations Battalion.
AD-387 095 952 PC A03/MF A01
OACSFOR-OT-RD-670428
Lessons Learned, Headquarters, 1ST Logistical Command.
AD-388 891 958 PC A04/MF A01
OACSFOR-OT-RD-670440
Lessons Learned, Headquarters, 29TH General Support Group.
AD-388 160 955 PC A03/MF A01
OACSFOR-OT-RD-670441
Lessons Learned, Headquarters, 34TH General Support Group (Am and S).
AD-388 161 956 PC A03/MF A01
OACSFOR-OT-RD-670466
Lessons Learned, Headquarters, 1ST Brigade,101ST Airborne Division.
AD-388 162 956 PC A03/MF A01
OACSFOR-OT-RD-670467
Lessons Learned, Headquarters, 199TH Infantry Brigade (Sep) (Light).
AD-388 892 958 PC A04/MF A01
OACSFOR-OT-RD-670468
Lessons Learned, Headquarters, 1ST Infantry Division.
AD-388 163 956 PC A06/MF A01
OACSFOR-OT-RD-670472
Lessons Learned, Headquarters, 11TH Armored Cavalry Regiment.
AD-388 893 958 PC A03/MF A01
OACSFOR-OT-RD-670481
Lessons Learned, Headquarters, 135th Military Intelligence Group.
AD-510 932 960 PC A02/MF A01
OACSFOR-OT-RD-670554
Lessons Learned, Headquarters, 62D Maintenance Battalion (Ds).
AD-387 096 952 PC A02/MF A01
OACSFOR-OT-RD-670570
Lessons Learned, Headquarters, Task Force Oregon(Americal Division).
AD-387 801 955 PC A05/MF A01
OACSFOR-OT-RD-670577
Lessons Learned, Headquarters, 1ST Brigade,101ST Airborne Division.
AD-387 285 952 PC A03/MF A01
OACSFOR-OT-RD-670584
Lessons Learned, Headquarters, II Field Force Vietnam.
AD-387 282 952 PC A05/MF A01
OACSFOR-OT-RD-670628
Lessons Learned, Headquarters, 1ST Military Intelligence Battalion (Ars).
AD-388 286 949 PC A02/MF A01
OACSFOR-OT-RD-670629
Lessons Learned, Headquarters, 63D Maintenance Battalion (Ds).
AD-387 097 952 PC A02/MF A01
OACSFOR-OT-RD-670657
Lessons Learned, Headquarters, 199TH Infantry Brigade (Sep) (Light).
AD-388 894 958 PC A03/MF A01
OACSFOR-OT-RD-670659
Lessons Learned, Headquarters, 34TH General Support Group (Am and S).
AD-388 164 956 PC A02/MF A01
OACSFOR-OT-RD-670661
Lessons Learned, Headquarters, 18TH Military Police Brigade.
AD-388 287 956 PC A03/MF A01
OACSFOR-OT-RD-670701
Lessons Learned, Headquarters, 3D Brigade,25TH Infantry Division.
AD-387 363 952 PC A05/MF A01
OACSFOR-OT-RD-670742
Lessons Learned, Headquarters, 1ST Infantry Division.
AD-387 145 952 PC A09/MF A01
OACSFOR-OT-RD-670751
Lessons Learned, Headquarters, II Field Force Vietnam.
AD-388 165 956 PC A06/MF A01
OACSFOR-OT-RD-670772
Lessons Learned, Headquarters, 196TH Light Infantry Brigade.
AD-387 362 952 PC A04/MF A01
OACSFOR-OT-RD-670833
Lessons Learned, Headquarters, 11TH Armored Cavalry Regiment.
AD-387 684 955 PC A03/MF A01
OACSFOR-OT-RD-674002
Lessons Learned, Headquarters, 3D Ordnance Battalion (Ammo).
AD-389 012 958 PC A03/MF A01
OACSFOR-OT-RD-674004
Lessons Learned, Headquarters, 3D Battalion,18TH Artillery.
AD-388 844 957 PC A03/MF A01
OACSFOR-OT-RD-674007
Lessons Learned, Headquarters, 2D Battalion,11TH Artillery.
AD-387 630 954 PC A02/MF A01
OACSFOR-OT-RD-674014
Lessons Learned, Headquarters, 16TH Military Police Group.
AD-388 577 957 PC A02/MF A01
OACSFOR-OT-RD-674024
Lessons Learned, Headquarters, 191ST Ordnance Battalion.
AD-387 571 953 PC A02/MF A01
OACSFOR-OT-RD-674027
Lessons Learned, Headquarters, 88TH Supply and Service Battalion (Ds).
AD-387 518 953 PC A02/MF A01
OACSFOR-OT-RD-674057
Lessons Learned, Headquarters, 223D Combat Support Aviation Battalion.
AD-388 975 958 PC A03/MF A01
OACSFOR-OT-RD-674058
Lessons Learned, Headquarters, 14TH Combat Aviation Battalion.
AD-388 847 957 PC A03/MF A01
OACSFOR-OT-RD-674060
Lessons Learned, Headquarters, 52D Combat Aviation Battalion.
AD-388 906 958 PC A03/MF A01
OACSFOR-OT-RD-674061
Lessons Learned, Headquarters, 10TH Combat Aviation Battalion.
AD-387 535 953 PC A03/MF A01
OACSFOR-OT-RD-674076
Lessons Learned, Headquarters, 23D Artillery Group.
AD-387 542 953 PC A02/MF A01
OACSFOR-OT-RD-674078
Lessons Learned, Headquarters, I Field Force Vietnam.
AD-387 936 955 PC A04/MF A01
OACSFOR-OT-RD-674100
Lessons Learned, Headquarters, 716TH Military Police Battalion.

AD-388 315 956 PC A02/MF A01

OACSFOR-OT-RD-674110
Lessons Learned, Headquarters, 222D Aviation Battalion.
AD-387 631 954 PC A03/MF A01

OACSFOR-OT-RD-674131
Lessons Learned, Headquarters, 54TH Artillery Group.
AD-388 747 957 PC A02/MF A01

OACSFOR-OT-RD-674133
Lessons Learned, Headquarters, 214TH Combat Aviation Battalion.
AD-388 997 958 PC A03/MF A01

OACSFOR-OT-RD-674134
Lessons Learned, Headquarters, 11TH Combat Aviation Battalion.
AD-387 538 953 PC A03/MF A01

OACSFOR-OT-RD-674137
Lessons Learned, Headquarters, 269TH Combat Aviation Battalion.
AD-388 842 957 PC A08/MF A01

OACSFOR-OT-RD-674138
Lessons Learned, Headquarters, 145TH Combat Aviation Battalion.
AD-388 475 957 PC A03/MF A01

OACSFOR-OT-RD-674139
Lessons Learned, Headquarters, Tuy Hoa Subarea Command.
AD-387 286 952 PC A03/MF A01

OACSFOR-OT-RD-674140
Lessons Learned, Headquarters, 13TH Combat Aviation (Delta) Battalion.
AD-388 476 957 PC A02/MF A01

OACSFOR-OT-RD-674158
Lessons Learned, Headquarters, 1ST Battalion,27TH Artillery.
AD-387 574 954 PC A02/MF A01

OACSFOR-OT-RD-674164
Lessons Learned, Headquarters, 12TH Combat Aviation Group.
AD-388 846 957 PC A04/MF A01

OACSFOR-OT-RD-674180
Lessons Learned, Headquarters, 7TH Battalion,9TH Artillery.
AD-387 472 953 PC A02/MF A01

OACSFOR-OT-RD-674182
Lessons Learned, Headquarters, 7TH Battalion,8TH Artillery.
AD-387 515 953 PC A02/MF A01

OACSFOR-OT-RD-674184
Lessons Learned, Headquarters, 2D Signal Group.
AD-387 536 953 PC A04/MF A01

OACSFOR-OT-RD-674185
Lessons Learned, Headquarters, 17TH Combat Aviation Group.
AD-387 572 953 PC A02/MF A01

OACSFOR-OT-RD-674186
Lessons Learned, Headquarters, II Field Force Vietnam Artillery.
AD-387 505 953 PC A02/MF A01

OACSFOR-OT-RD-674187
Lessons Learned, Headquarters, 2D Battalion94th Artillery.
AD-387 399 953 PC A03/MF A01

OACSFOR-OT-RD-674190
Lessons Learned, Headquarters, 4TH Battalion,60TH Artillery.
AD-387 685 955 PC A03/MF A01

OACSFOR-OT-RD-674191
Lessons Learned, Headquarters, 1ST Battalion (Aw)(Sp),44TH Artillery.
AD-387 516 953 PC A02/MF A01

OACSFOR-OT-RD-674192
Lessons Learned, Headquarters, 1ST Battalion,40TH Artillery.
AD-387 539 953 PC A02/MF A01

OACSFOR-OT-RD-674193
Lessons Learned, Headquarters, 6TH Battalion,32D Artillery.
AD-388 312 956 PC A02/MF A01

OACSFOR-OT-RD-674195
Lessons Learned, Headquarters, 1ST Battalion,30TH Artillery.
AD-387 477 953 PC A02/MF A01

OACSFOR-OT-RD-674198
Lessons Learned, Headquarters, 6TH Battalion,14TH Artillery.
AD-387 519 953 PC A02/MF A01

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